PLC Connection Manual

Record of Revisions

Reference numbers are shown at the bottom left corner on the back cover of each manual.

Printing Date	Reference No.	Revised Contents
February, 2004	2200NE0	First edition
October, 2004	2200NE0a	only in PDF file
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Preface

Thank you for selecting the MONITOUCH V7 series.
For correct set-up of the V7 series, you are requested to read through this manual to understand more about the product.
For more information about the V7 series, refer to the following related manuals.

Manual Name	Contents	Reference No.
Reference Manual	The functions and instructions of the V7/V6 series are explained in details.	1050NE
Operation Manual	The operating procedure and limited subjects of V-SFT version 3 are described.	1054NE
Macro Reference	An overview of macros of V-SFT version 3 as well as macro editor operations and macro command description.	1051NE
Introductory Manual	The basic operating procedure of V-SFT version 3 is explained in details.	1052NE
Tutorial	The outline and creating procedure of functions used frequency are explained in details.	1053NE
V7 Hardware Specifications	Notes on usage and hardware specifications for the V7 series are described.	2010NE
V706 Hardware Specifications	Notes on usage and hardware specifications for the V706 are described.	2012NE
V715 Hardware Specifications	Notes on usage and hardware specifications for the V715 are described.	2015NE
Temperature Control Network	The temperature control network function is explained.	1033NE
Specifications for CC-LINK Communication Unit	Instructions for CC-LINK are contained.	1028NE
Specifications for PROFIBUS Communication Unit	Instructions for PROFIBUS are contained.	1036NE
Connection with AB Control Logix	The connection, communication parameters and tag setting for AB Control Logix are explained.	1041NE
M-CARD SFT Operation Manual	The operating procedure of the memory card editor is described.	1023NE
Ladder Monitor Specifications	Instructions for the ladder monitor function are contained.	1045NE

For further details about PLCs (programmable logic controllers), see the manual attached to each PLC.

Notes:

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4. All other company names or product names are trademarks or registered trademarks of their respective holders.
5. This manual is intended to give accurate information about MONITOUCH hardware. If you have any questions, please contact your local distributor.

Notes on Safe Use of MONITOUCH

In this manual, you will find various notes categorized under the following levels with the signal words “DANGER,” and “CAUTION.”

DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and could cause property damage.

Note that there is a possibility that the item listed with CAUTION may have serious ramifications.

DANGER

- Never use the input function of MONITOUCH for operations that may threaten human life or to damage the system, such as switches to be used in case of emergency. Please design the system so that it can cope with malfunction of a touch switch. A malfunction of the touch switch will result in machine accident or damage.
- Turn off the power supply when you set up the unit, connect cables or perform maintenance and inspection. Otherwise, electrical shock or damage may occur.
- Never touch any terminals while the power is on. Otherwise, electric shock may occur.
- You must put a cover on the terminals on the unit when you turn the power on and operate the unit. Without the terminal cover in place, an electric shock may occur.
- The liquid crystal in the LCD panel is a hazardous substance. If the LCD panel is damaged, never swallow the leaked liquid crystal. If the liquid crystal spills on your skin or clothing, use soap and wash off thoroughly.
- For MONITOUCH using a lithium battery, never disassemble, recharge, deform by pressure, short-circuit, nor reverse the polarity of the battery, and never dispose of the battery in fire. Failure to follow these conditions will lead to explosion or ignition.
- For MONITOUCH using a lithium battery, never use a battery that is deformed, leaks, or shows any other signs of abnormality. Failure to follow these conditions will lead to explosion or ignition.

⚠CAUTION

- Check the appearance of the unit when it is unpacked. Do not use the unit if any damage or deformation is found. Failure to do so may lead to fire, damage or malfunction.
- For use in a facility or for a system related to nuclear energy, aerospace, medical, traffic equipment, or mobile installations, please consult your local distributor.
- Operate (or store) MONITOUCH under the conditions indicated in this manual and related manuals. Failure to do so could cause fire, malfunction, physical damage or deterioration.
- Understand the following environmental limits for use and storage of MONITOUCH. Otherwise, fire or damage to the unit may result.
  - Avoid locations where there is a possibility that water, corrosive gas, flammable gas, solvents, grinding fluids or cutting oil can come into contact with the unit.
  - Avoid high temperature, high humidity, and outside weather conditions, such as wind, rain or direct sunlight.
  - Avoid locations where excessive dust, salt, and metallic particles are present.
  - Avoid installing the unit in a location where vibration or physical shock may be transmitted.
- Equipment must be correctly mounted so that the main terminal of MONITOUCH will not be touched inadvertently. Otherwise, an accident or electric shock may occur.
- Tighten the fixtures of the MONITOUCH with a torque in the specified range. Excessive tightening may distort the panel surface. Loose tightening may cause MONITOUCH to come off, malfunction or be short-circuited.
- Check periodically that terminal screws on the power supply terminal block and fixtures are firmly tightened. Loosened screws may result in fire or malfunction.
- Tighten terminal screws on the power supply terminal block equally to a torque of 0.5 N•m. Improper tightening of screws may result in fire, malfunction, or trouble.
- MONITOUCH has a glass screen. Do not drop or give physical shock to the unit. Otherwise, the screen may be damaged.
- Connect the cables correctly to the terminals of MONITOUCH in accordance with the specified voltage and wattage. Over-voltage, over-wattage or incorrect cable connection could cause fire, malfunction or damage to the unit.
- Be sure to establish a ground of MONITOUCH. Ground FG terminal which must be used for the unit. Otherwise, electric shock or a fire may occur.
- Prevent any conductive particles from entering into MONITOUCH. Failure to do so may lead to fire, damage or malfunction.
- After wiring is finished, remove the paper used as a dust cover before starting to operate MONITOUCH. Operation with the cover attached may result in accident, fire, malfunction, or trouble.
- Do not attempt to repair MONITOUCH at your site. Ask Hakko or the designated contractor for repair.
- Do not disassemble or modify MONITOUCH. Otherwise, it may cause a malfunction.
- Hakko Electronics Co., Ltd. is not responsible for any damages resulting from repair, overhaul or modification of MONITOUCH that was performed by an unauthorized person.
- Do not use a sharp-pointed tool when pressing a touch switch. Doing so may damage the screen.
- Only experts are authorized to set up the unit, connect the cables or perform maintenance and inspection.
- For MONITOUCH using a lithium battery, handle the battery with care. The combustible materials such as lithium or organic solvent contained in the battery may generate heat, explode, or catch fire, resulting in personal injury or fire. Read related manuals carefully and handle the lithium battery correctly as instructed.
- When using a MONITOUCH that has analog switch resolution with resistance film, do not press two or more points on the screen at the same time. If there is a switch between the two pressed points, it may be activated.
- Take safety precautions during such operations as setting change during running, forced output, start, and stop. Any misoperation may cause unexpected machine motions, resulting in machine accident or damage.
- In facilities where a failure of MONITOUCH could lead to accident threatening human life or other serious damage, be sure that the facilities are equipped with adequate safeguards.
- At the time of disposal, MONITOUCH must be treated as industrial waste.
- Before touching MONITOUCH, discharge static electricity from your body by touching grounded metal. Excessive static electricity may cause malfunction or trouble.

[General Notes]

- Never bundle control cables and input/output cables with high-voltage and large-current carrying cables such as power supply cables. Keep these cables at least 200 mm away from the high-voltage and large-current carrying cables. Otherwise, malfunction may occur due to noise.
- When using MONITOUCH in an environment where a source of high-frequency noise is present, it is recommended that the FG shielded cable (communication cable) be grounded at its ends. However, the cable may be grounded only at one end if this is necessary due to unstable communication conditions or for any other reason.
- Plug connectors or sockets of MONITOUCH in the correct orientation. Otherwise, it may cause a malfunction.
- Do not use thinners for cleaning because they may discolor the MONITOUCH surface. Use alcohol or benzine commercially available.
- If a data receive error occurs when MONITOUCH and the counterpart (PLC, temperature controller, etc.) are started at the same time, read the manual for the counterpart unit and handle the error correctly.
- Avoid discharging static electricity on the mounting panel of the MONITOUCH. Static charges can damage the unit and cause malfunctions. Otherwise, malfunction may occur due to noise.
- Avoid prolonged display of any fixed pattern. Due to the characteristics of the liquid crystal display, an afterimage may occur. If a prolonged display of a fixed pattern is expected, use the auto OFF function of the backlight.

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1. Before Connecting to PLC

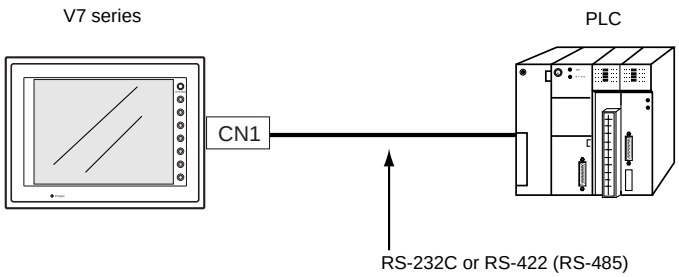
Types of Connection

There are four types of connection between MONITOUCH(es) and PLC(s).

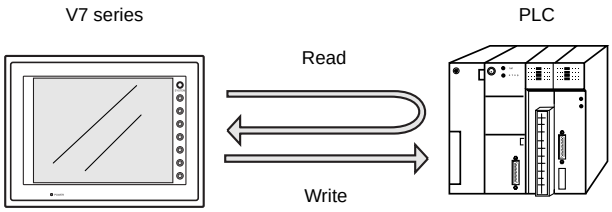
1 : 1 Connection

Outline

One set of the V7 series is connected to one PLC (1 : 1 connection).
The wiring diagrams and the description of settings for connection to PLCs in 1 : 1 connections can be found from Chapter 2 onward.



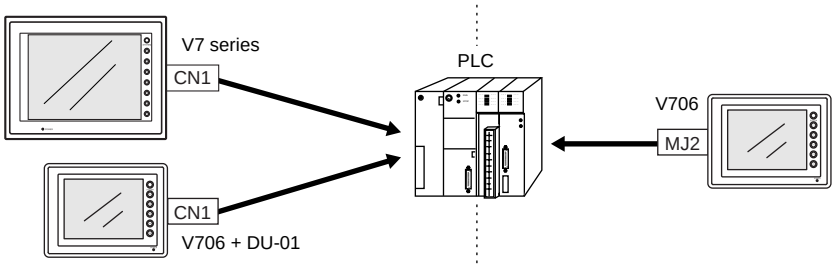
The host link unit of the PLC or the CPU port is used and the V7 series (master station) establishes communications according to the protocol of the PLC. Consequently, it is not necessary to have the dedicated communication program on the PLC (slave station). The V7 series reads the PLC memory for screen display. It is also possible to write switch data or numerical data entered through the keypad directly to the PLC memory.



Connection

The interface used for 1 : 1 connection varies depending on the V7 series model.

- CN1 (D-sub 25-pin) for V7 series and V706 + DU-01
- MJ2 (RJ-45 8-pin) for V706

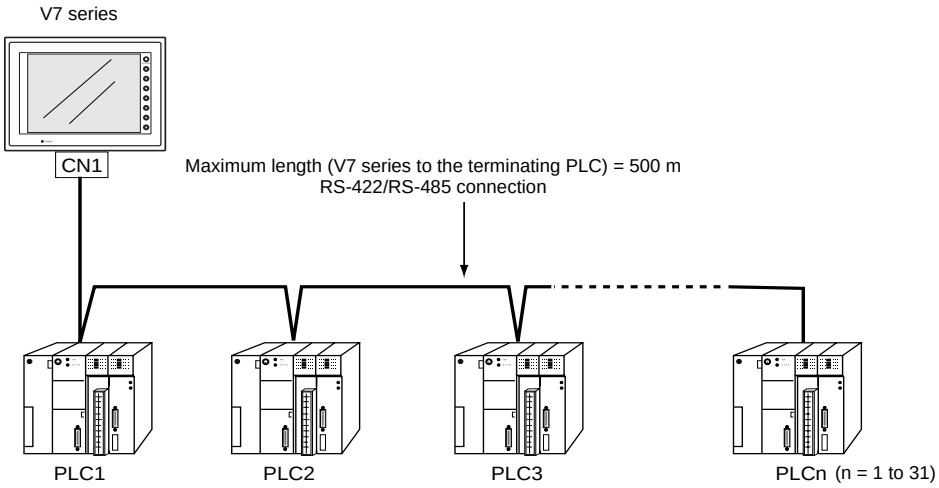


For details on wiring and settings for 1 : 1 connection, refer to page 1-8.

1 : n Connection (Multi-drop)

Outline

One V7 series is connected to multiple PLCs. (Maximum connectable PLCs: 31)



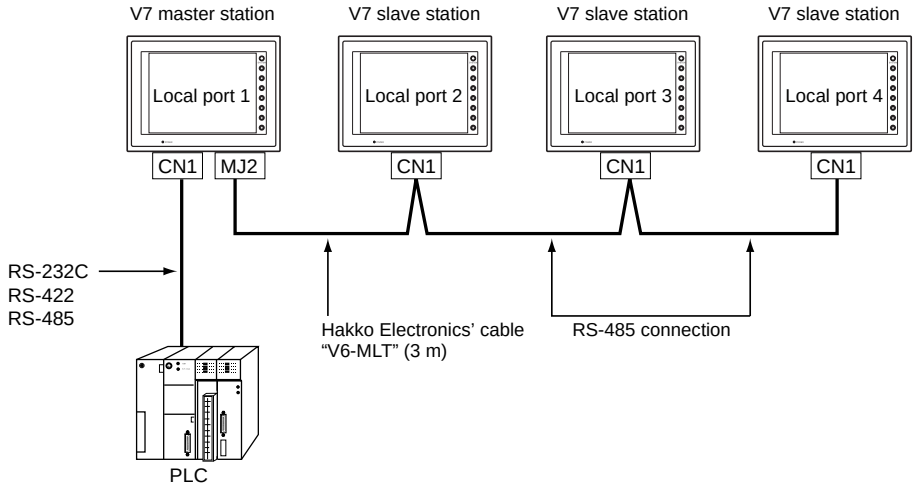
Notes on Connection

For more information, refer to “Appendix 4, 1 : n Connection (Multi-drop).”

n : 1 Connection (Multi-link 2)

Outline

- One PLC is connected to a maximum of four V7 series.
- An original network is created where the V7 series (Local Port 1) that is directly connected to the PLC is the master station, and other three V7 series are slave stations. Only the master station makes communications directly with the PLC, and the slave stations make communications with the PLC via the master station.



- Communications between the V7 master station and the PLC depend on the communication speed set on the PLC. The maximum available speed for the V7 series is 115 kbps, which is higher than the one available with multi-link connection described in "n : 1 Connection (Multi-link)" (page 1-4).
- This multi-link connection is available with almost all the PLC models that support 1 : 1 connection (refer to the "Appendix").
  The connection between the master station and the PLC is the same as the one for 1 : 1 connection.
- Use the RS-485 2-wire connection between stations of the V7 series. Please use Hakko Electronics' multi-link 2 master cable (V6-MLT) for connection between the master station (Local Port 1) and the slave station (Local Port 2).
- In the following cases, multi-link 2 connection is not available.
  1. A communication interface unit (example: OPCN-1, CC-LINK, Ethernet, etc.) is used.
  2. The V6 series (master or slave station) is used for the temperature control network or PLC2Way function.
- The V7 and V6 series can be used together. The V6 series can be the master station. (However, when V609E/V606e/V606/V606i is the master station, the slave station must be V609E/V606e/V606/V606i. Also, depending on the hardware version of the V6 series, multi-link 2 connection may not be supported. Refer to the V6 Hardware Specifications.)

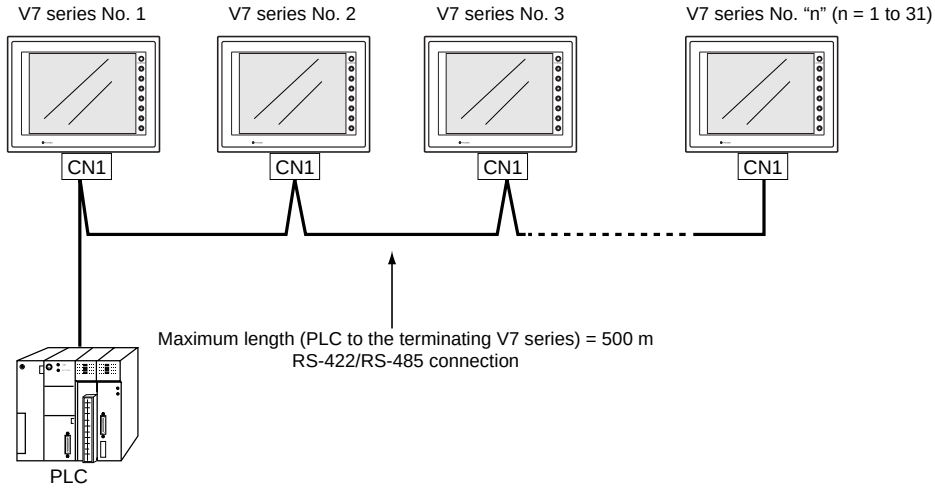
Notes on Connection

For more information, refer to "Appendix 2, n : 1 Connection (Multi-link 2)."

n : 1 Connection (Multi-link)

Outline

- One PLC is connected to multiple V7 series. (Maximum connectable V series: 31)



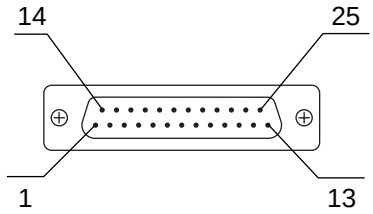
- The PLC must be of the type of signal level RS-422/RS-485 with port numbers.
  For the available PLC models, refer to "Connection Compatibility List" at the back of this manual.
  RS-422 connection between the V7 series ↔ PLC must be in 2-wire connection.
- The V7 and V6 series can be used together.

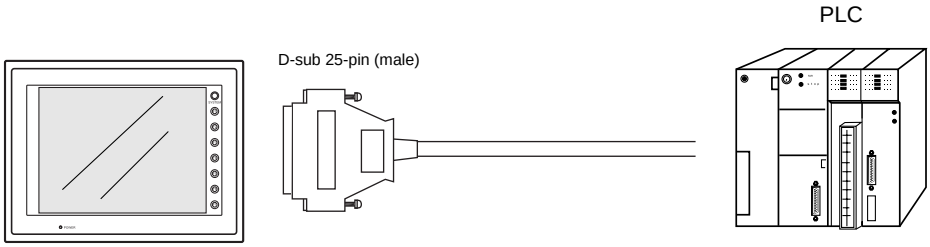
Notes on Connection

For more information, refer to "Appendix 3, n : 1 Connection (Multi-link)."

Interface

CN1 (D-sub 25-pin) (V7 series and V706 + DU-01)

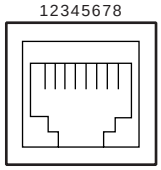
CN1 (D-sub 25-pin, female)	Pin No.	Signal Name	Contents
	1	FG	Frame ground
	2	SD	RS-232C send data
	3	RD	RS-232C receive data
	4	RS	RS-232C RS request to send
	5	CS	RS-232C CS clear to send
	6		Not used
	7	SG	Signal ground
	8		Not used
	9	+5 V	Use prohibited
	10	0 V	Use prohibited
	11		Not used
	12	+SD	RS-422 send data (+)
	13	–SD	RS-422 send data (–)
	14	+RS	RS-422 RS send data (+)
	15		Not used
	16		Not used
	17	–RS	RS-422 RS send data (–)
	18	–CS	RS-422 CS receive data (–)
	19	+CS	RS-422 CS receive data (+)
	20		Not used
	21	–	Use prohibited (V708: not used)
	22	–	Use prohibited (V708: not used)
	23		Not used
	24	+RD	RS-422 receive data (+)
	25	–RD	RS-422 receive data (–)



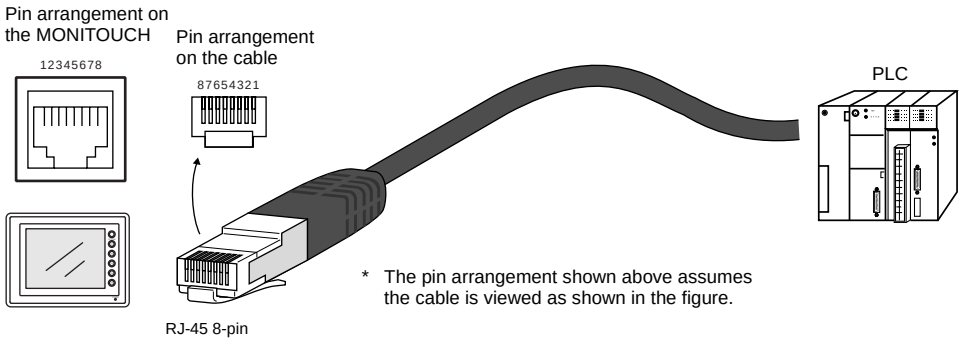
The following connector is recommended.

Recommended connector	DDK 17JE23250-02 (D8A)	D-sub 25-pin, male, metric thread, with hood

MJ2 (V706 only)

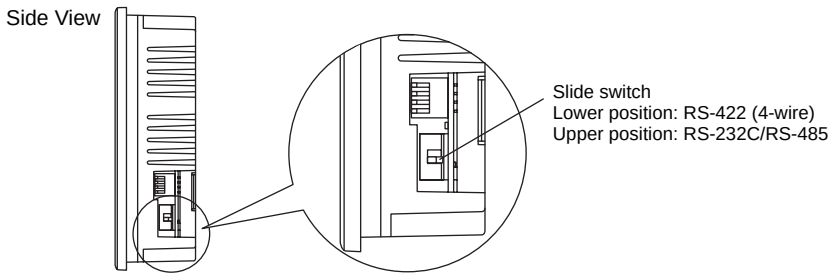
MJ2	Pin No.	Signal Name	Contents
12345678 	1 *1	+SD/RD	RS-485 + data
		+SD	RS-422 + send data
	2 *1	–SD/RD	RS-485 – data
		–SD	RS-422 – send data
	3	+5 V	Externally supplied +5 V Max. 150 mA *2
	4		
	5	SG	Signal ground
	6		
	7 *1	RD	RS-232C receive data
		+RD	RS-422 + receive data
	8 *1	SD	RS-232C send data
		-RD	RS-422 – receive data

*1 Switch between RS-232C/RS-485 and RS-422 for pin Nos. 1, 2, 7, and 8 with the slide switch on the MONITOUCH. For more information, refer to “Slide Switch.”
*2 The maximum current for the output power supply (+5 V) is 150 mA when MJ1 or MJ2 is used.



Slide Switch

- Whether MJ2 is used as an RS-232C/RS-485 or RS-422 (4-wire) port is selected with the slide switch. Before connecting a V706 to a PLC, check that the switch is set to the correct side.
- The slide switch is adjacent to the DIP switch on the side of the V706.
  The switch is factory-set to RS-422. When RS-422 is selected, the slide switch is in the lower position. To select RS-232C/RS485, slide the switch to the upper position.

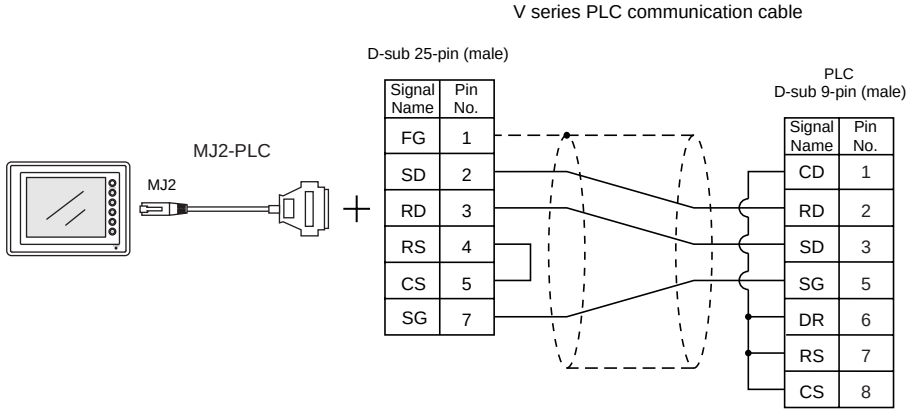


Connection between MJ2 and PLC

There are two connection methods.

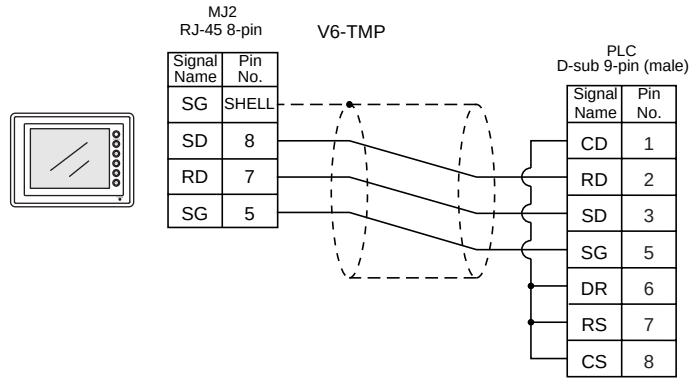
- With MJ2-PLC
  One method uses an adaptor MJ2-PLC for connection between MJ2 and the D-sub 25-pin connector plus a PLC communication cable.
  For connection of a PLC communication cable, refer to the CN1 pin arrangement.

  Example: Connecting to MITSUBISHI A1SJ71UC24-R2



- With V6-TMP
  Refer to the PLC wiring diagram and the MJ2 pin arrangement.

  Example: Connecting to MITSUBISHI A1SJ71UC24-R2



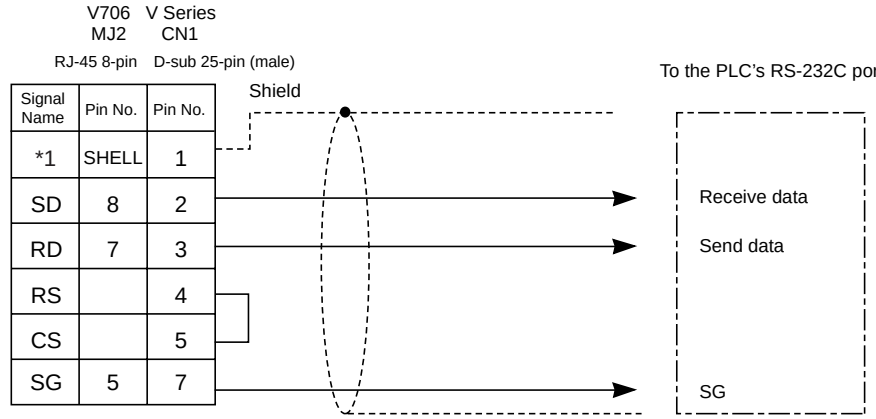
Wiring (1 : 1 Connection)

DANGER Electric shock hazard
Shut the power off before connecting cables.

Prepare the communication cable with the PLC on your side.
Refer to the following information for the cable.
For more information on the connection to respective PLCs, refer to “Chapter 2” and later.

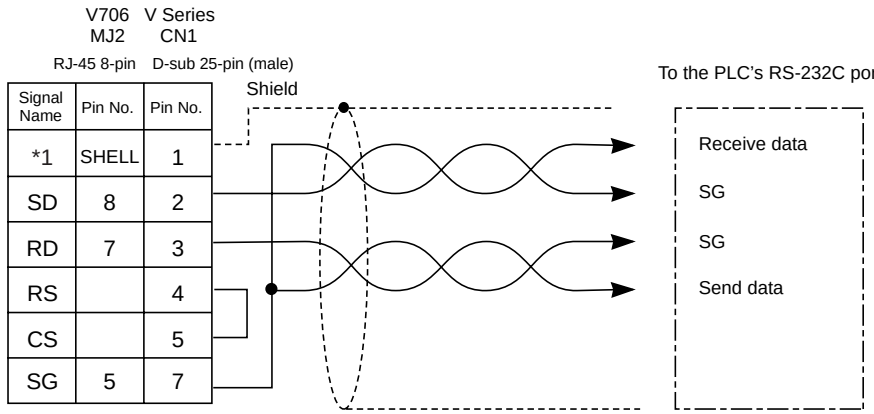
RS-232C Connection

- Connect the shielded cable either to the V7 series or PLC side. This connection diagram shows the case where the shielded cable is connected on the V7 series side.
  When connecting the shielded cable to the V7 series side, connect it to pin 1 of the connector or the connector case cover.
  The metal shell of the modular jack 2 on the V706 is used as SG (signal ground). Connect the shielded cable to the metal shell of modular jack 2.
- Twisted pairs of 0.3 mm sq. or above are recommended.



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

- If noise disturbs communications, use twisted pairs between SD/SG and RD/SG.

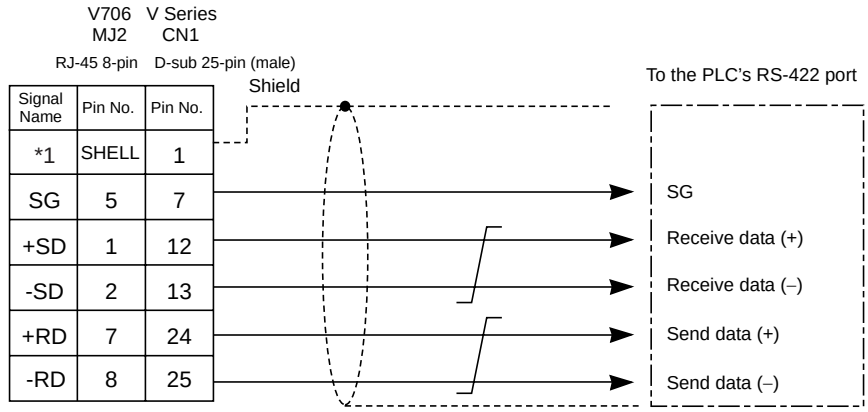


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

RS-422/485 Connection

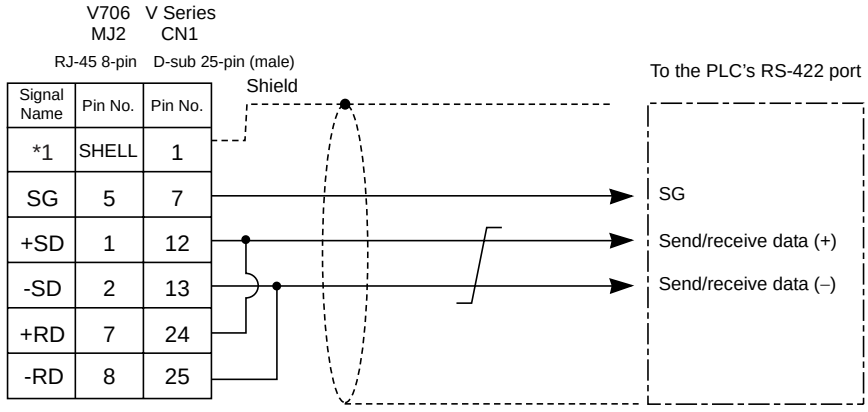
- Connect twisted pairs between +SD/–SD and +RD/–RD.
- If the PLC has the terminal for signal ground (SG), be sure to connect a wire.
- Connect the shielded cable either to the V7 series or PLC side. This connection diagram shows the case where the shielded cable is connected on the V7 series side.
  When connecting the shielded cable to the V7 series side, connect it to pin 1 of the connector or the connector case cover.
  The metal shell of the modular jack 2 on the V706 is used as SG (signal ground). Connect the shielded cable to the metal shell of modular jack 2.
- To use a terminal block for connection, use Hakko Electronics' "TC485" optionally available. When using TC485 on the V706, the option unit DU-01 must be installed.
- The DIP switch on the side or back of V7 series units is used to set the terminating resistors. For more information, refer to the description of the DIP switch setting in the relevant Hardware Specifications.
- Twisted pairs of 0.3 mm sq. or above are recommended.

<4-wire system>



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

<2-wire system>



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

V-SFT Setting (1 : 1 Connection)

For serial communications, the following settings on the V-SFT editor are required.
The settings in the [Select PLC Type] and [Comm. Parameter] dialogs are shown on the Main Menu screen of the V7 series. (For more information, refer to “Chapter 6, MONITOUCH Operations” in V7 Hardware Specifications.)

PLC Selection

Select the PLC that is connected.

- Setting Procedure
  [System Setting] → [PLC Communication] → [PLC Model] dialog

Communication Parameter Setting

The communication parameter setting is essential for successful communications between the V7 series ↔ PLC. Check the communication parameter setting on the PLC before making the setting on MONITOUCH.

- Setting Procedure
  [System Setting] → [PLC Communication] → [Communication Parameter] dialog
- Setting Items
  [Connection] (1 : 1 / 1 : n / Multi-Link / Multi-Link 2)
  Select the type of connection between the V7 series and the PLC. There are four types available. Depending on the selected type, the setting items in the [Comm. Parameter] dialog or those for the memory vary.
  Select [1 : 1] for 1 : 1 connection.

  [Target Port No. Monitoring]
  Set the port number of the PLC.

  [Transmission Mode]
  When the PLC has a transmission mode setting, set the same on the V7 series.
  This setting must be used for PLCs of MITSUBISHI, OMRON, HITACHI, YOKOGAWA, Toyoda Machinery and YASKAWA.

  [Baud Rate] [Signal Level] [Data Length] [Stop Bit] [Parity]
  Make the same setting as the PLC. (Refer to “Chapter 2” and later.)

  [Baud Rate] (4800, 9600, 19200, 38400, 57600, 76800, 115 kbps)
  Set the same communication speed as the PLC.

  [Signal Level] (RS-232C/RS-422)
  Set the same communication interface as the PLC.

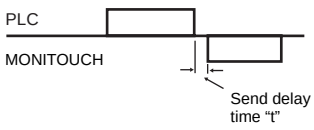
  [Data Length] (7-bit/8-bit)
  Choose either data length for communication.

  [Stop Bit] (1-bit/2-bit)
  Choose either stop bit for communication.

  [Parity] (None/Odd/Even)
  Choose any of the parity options for communication.

  [Send Delay Time] (0 to 255) (Unit: ×1 msec)
  Set a time delay in sending the next command to the PLC after receipt of a response from the PLC.
  Normally use the default setting.

  [Start Time] (0 to 255) (Unit: ×1 sec)
  Set a time delay in sending the communication command to the PLC when the power of MONITOUCH is turned on.



Choose the action to be taken against communication errors.

[Comm. Err. Handling]

Set error handling routine in the case that a communication error between the V7 series and the PLC occurs.

[Stop] If any communication error has arisen, the communications are stopped. When restoring, use the Retry switch (found on the error screen of the V7 series).

[Continuous] If any communication error has arisen, it is indicated at the top left corner on the V7 screen. The V7 series conducts polling of the PLC, and if OK, the error state is automatically reset.

> Supplemental Information:
> Polling
> "Polling" means to constantly monitor and check the state of the other station.

[Time-out Time] (0 to 999) (Unit: ×10 msec)

Specify a time for monitoring the receiving of a response from the PLC. If no response is received within the specified time, a retrial is attempted.

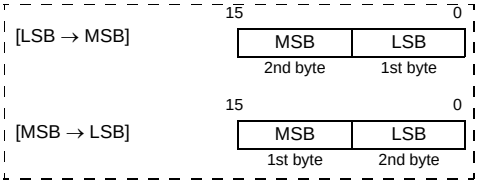
[Retrials] (1 to 255)

Specify the number of retrial times. When the problem persists even after as many retrials as specified, the system will start the error handling routine.

[Text Process]

(LSB → MSB / MSB → LSB)

When processing characters, choose either option for arranging 1st/2nd bytes in one word.



[Code] (DEC/BCD)

Choose the code for entering numerical data.

For some numerical data, such as those for data displays or data sampling in the sampling mode, this setting is not applied because BCD or DEC should be chosen for [Input Format].

[Read Area] [Write Area]

For more information, refer to "System Memory" (page 1-12).

[☐ Read/Write Area GD-80 Compatible]

When converting screen data files created on GD-80 into those of the V7 series, this option is automatically checked.

When this option is checked, GD-80 compatibility is supported by securing 2 words each for [Read Area] and [Write Area] in the same format as GD-80. For more information, refer to the GD-80 User's Manual.

[☐ Use Ethernet]

When using Ethernet communications, check this option.

For details, refer to "9. Ethernet" in "Chapter 5, Connections" in the separate V7 Hardware Specifications.

System Memory

[Read Area] and [Write Area] must be secured for communications between the V7 series and the PLC.

- Setting Procedure
  [System Setting] → [PLC Communication] → [Communication Parameter] dialog
- Setting Items
  [Read Area] (3 words or more)*
  - This is the area where commands from the PLC are received for screen display changes. Consecutive three words from the specified memory address are used as “read area.”

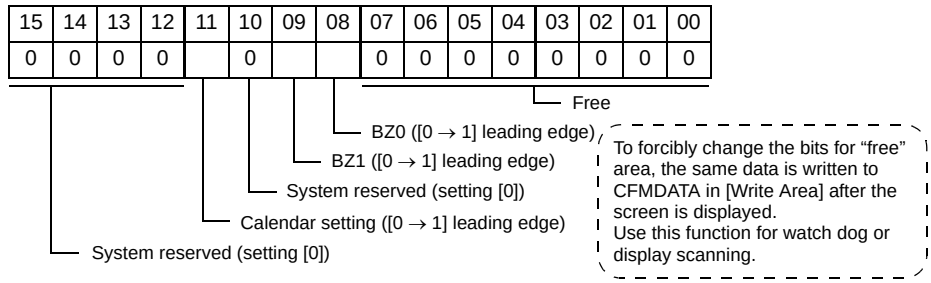
Address	Name	Contents
n	RCVDAT	Sub command/data
n + 1	SCRN_COM	Screen status command
n + 2	SCRN_No	Screen number command

* When you have created screens with the following function, the number of required memory addresses vary.

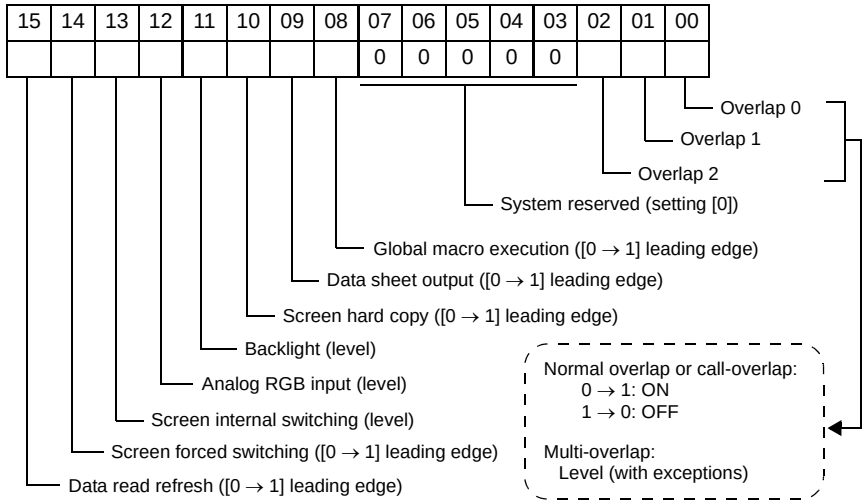
- When the sampling function is used:
  Refer to “Appendix 1 Buffering Area" in the Reference Manual.
- [☐ Read/Write Area GD-80 Compatible] is checked:
  Refer to the GD-80 User’s Manual.

- Set “0” for all the bits not used in the read area.

- RCVDAT (n) Sub command/data



- SCRN_COM (n + 1) Screen status command



- SCRN_No. (n + 2) Screen number command

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0	0	0													

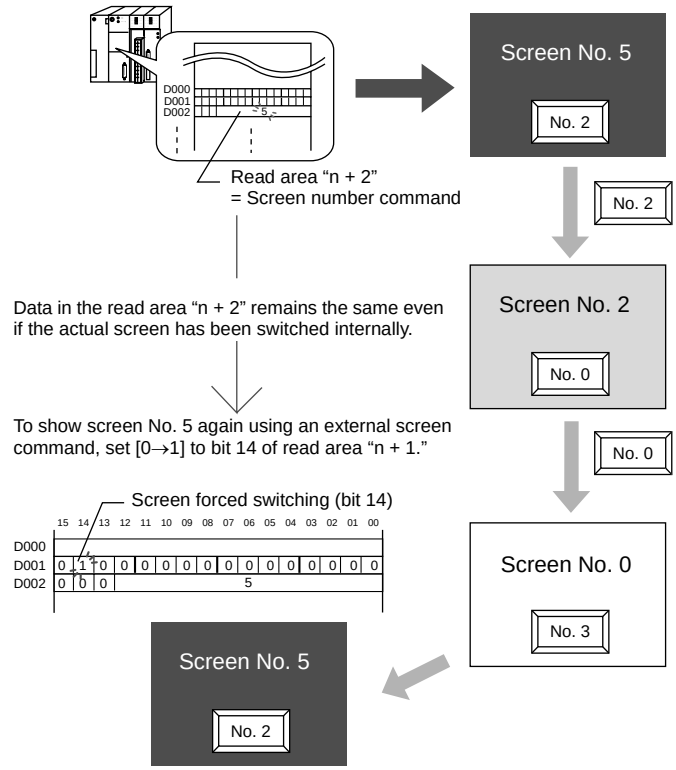
Screen number

System reserved (setting [0])

Use example: To specify a screen number from the PLC:
When “D0” is set for [Read Area], the screen number is written in “D2” of the PLC.

Problem example: The screen display does not change when a screen number is specified from the PLC.

If the same number as the one specified for “n + 2” is already contained in this memory address, the screen display does not change even if it is specified again.
For example, if screen No. 5 is specified from the PLC and it was once changed to screen No. 2 → No. 0 by internal switches, normally it cannot be returned to the former screen No. 5 that was specified by an external command, because the external screen command number (5) remains the same as before in the memory address (“D2” in the read area) for the screen number command. In such a case, it is possible to forcibly switch the screen to the screen number contained in “D2” in the read area at the leading edge [0 → 1] of bit 14 of the memory address for the screen status command (“D1” in the read area).



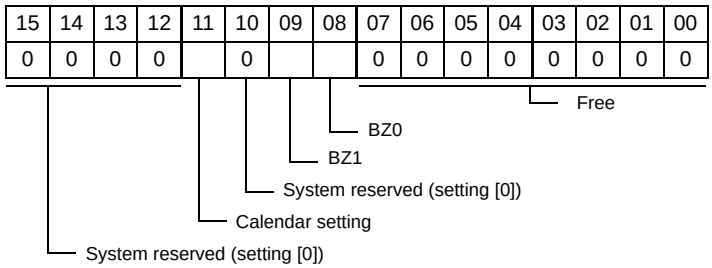
[Write Area] (3 words)*

This is an area where the screen status is written.
Consecutive three words from the specified memory address are used as “write area.”

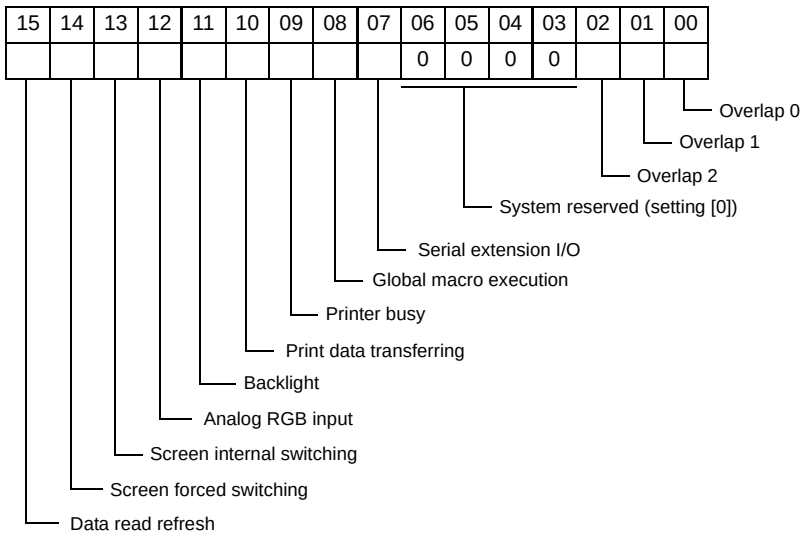
* When you have converted GD-80 data to the V7 series data, the number of required memory addresses vary. Refer to the GD-80 User’s Manual.

Address	Name	Contents
n	CFMDAT	Same as data in read area “n”
n + 1	SCRN_COM	Screen status
n + 2	SCRN_No	Displayed screen number

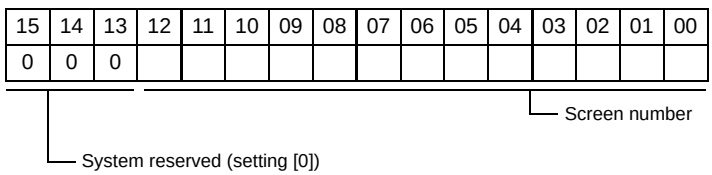
- CFMDAT (n)



- SCRN_COM (n + 1) Screen status



- SCRN_No. (n + 2) Displayed screen number



2. Allen-Bradley PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
PLC-5	PLC-5	1785-KE	RS-232C [Wiring Diagram 1]	×	×
		1770-KF2	RS-232C [Wiring Diagram 2] RS-422 [Wiring Diagram 7]		
	PLC-5/40	Channel 0	RS-232C [Wiring Diagram 6] RS-422 [Wiring Diagram 9]		
SLC500	SLC 5/03 and later	CPU (processor module) RS-232C channel	RS-232C [Wiring Diagram 3]	○	
		1747-KE	RS-232C [Wiring Diagram 4] RS-422 [Wiring Diagram 8]		
Micro Logix 1000	Micro Logix 1000	Port on CPU	A•B's RS-232C Ladder transfer cable*1 + RS-232 [Wiring Diagram 5]	×	
Control Logix	Control Logix 1756 system	Logix5550	*2		

*1 When using RS-232C ladder transfer cable made by Allen-Bradley, connect the cable shown in [Wiring Diagram 5] to the D-sub 9-pin side of the ladder transfer cable for communications with the V7 series.
*2 For more information on connection to A•B Control Logix, refer to "Connection with A•B Control Logix" separately provided.

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

PLC-5 Series

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		0	0
Parity		Even	Even
Transmission mode	RS-232C	–	–
	RS-422	1785-KE not supported	–
Transmission code	Data length	8	8
	Stop bit	1	1
Protocol		Full duplex (fixed)	–
Error check		BCC (fixed)	–
Reponse		NO (fixed)	–

SLC500 Series

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		0	0
Parity		Even	Even
Transmission mode	RS-232C	–	–
	RS-422	Channel 0 not supported	–
Transmission code	Data length	8	8
	Stop bit	1	1
Protocol		Full duplex (fixed)	–
Error check		BCC (fixed)	–
Reponse		NO (fixed)	–

Micro Logix 1000

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Port		0	0
Parity		None (fixed)	Not provided
Transmission code	Data length	8 (fixed)	8
	Stop bit	1 (fixed)	1
Error check		CRC (fixed)	–

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

PLC-5 Series

Memory		TYPE	Remarks
N	(integer)	0	
B	(bit)	1	
T.ACC	(timer/current value)	2	
T.PRE	(timer/set value)	3	
C.ACC	(counter/current value)	4	
C.PRE	(counter/set value)	5	
I	(input)	6	
O	(output)	7	
S	(status)	8	
T	(timer/control)	9	
C	(counter/control)	10	
R	(control)	11	
R.LEN	(control/data length)	12	
R.POS	(control/data position)	13	
D	(BCD)	14	
A	(ASCII)	15	

SLC500 Series, Micro Logix 1000

Memory		TYPE	Remarks
N	(integer)	0	
B	(bit)	1	
T.ACC	(timer/current value)	2	
T.PRE	(timer/set value)	3	
C.ACC	(counter/current value)	4	
C.PRE	(counter/set value)	5	
I	(input)	6	
O	(output)	7	
S	(status)	8	
T	(timer/control)	9	
C	(counter/control)	10	
R	(control)	11	
R.LEN	(control/data length)	12	
R.POS	(control/data position)	13	
D	(BCD)	14	
A	(ASCII)	15	
F	(FLOAT)	16	
ST	(STRING)	17	
L	(LONG)	18	Double-word, Micro Logix 1000 only

PLC-5 Series: Switch Setting

1785-KE

SW1 (Protocol)

No	Setting	Contents
1	ON	BCC, even, no
2	OFF	
3	OFF	
4	ON	Duplicated message unacceptable
5	OFF	Handshaking signal ignored
6	ON	Execution of diagnosis command

SW2 (Station number)

Set the station number of 1785-KE. (This station should not be duplicated in the network.)

No	Setting	Contents
1	ON	1st digit (octal)
2	ON	
3	ON/OFF	2nd digit (octal)
4	ON/OFF	
5	ON/OFF	
6	ON/OFF	3rd digit (octal)
7	ON/OFF	
8	ON/OFF	

SW3 (Network link communication speed)

Adjust to the settings of the network you are using.

No	Setting	Contents
1	ON	Data highway (57.6 kbps)
2	ON	
3	ON	Link communication speed (19.2 kbps)
4	ON	
5	ON	
6	ON	Local/remote selection

SW4 (Reserved)

No	Setting	Contents
1	OFF	For extension, always OFF
2	OFF	
3	OFF	
4	OFF	

1770-KF2

SW1 (Protocol)

No	Setting	Contents
1	ON	Protocol
2	OFF	Protocol
3	ON	Duplicated message unacceptable
4	OFF	Handshaking signal ignored
5	OFF	Protocol

SW2, SW3, SW4 (Station number)

Set the station number of 1770-KF2. (This station should not be duplicated in the network.)

SW5 (Network link communication speed)

Adjust to the settings of the network you are using.

Switch Setting		Contents
1	2	
ON	ON	57.6 kbps

SW6 (Asynchronous link communication speed)

Adjust to the settings of the V7 series.

No	Setting	Contents
1	OFF	9600 bps
2	ON	
3	ON	
4	ON	Execution of diagnosis command

SW7 (Network link selection)

Switch Setting		Contents
1	2	
ON	OFF	Peer transmission link

SW8 (RS-232C/RS-422 selection)

Switch Setting		Contents
1	2	
OFF	ON	RS-232C
ON	OFF	RS-422

PLC-5 Channel 0

Switch 2 (RS-232C/RS-422 setting)

Switch	RS-232C	RS-422
1	ON	OFF
2	ON	OFF
3	ON	ON
4	OFF	OFF
5	OFF	OFF
6	ON	OFF
7	ON	OFF
8	OFF	OFF
9	ON	ON
10	OFF	OFF

Channel Properties

Channel 0

- Communication Mode : System (Point-To-Point)
- Remote Mode Change : Unchecked (Disabled)

Serial Port

- Baud Rate : 19200
- Bits Per Char : 8
- Stop Bits : 1
- Parity : Even
- Error Detect : BCC
- Control Line : Full-Duplex

Options

- NAK Receive : 3
- DF1 ENQs : 3
- ACK Timeout (20ms) : 50
- Detect Duplicate Messages : Checked

SLC500 Series, Micro Logix 100: Transmission Parameter Setting

CPU Port Channel 0

Set up the parameters for CPU port channel 0 using the software specifically designed for this purpose.

Driver	: DF1 Full Duplex
Baud	: 19200
Parity	: EVEN
Control Line	: No Handshaking
Error Detection	: BCC
Embedded Responses	: Auto-Detect
Duplicate Packed Detect	: ON
ACK Timeout (×20 ms)	: 20
NAK Retries	: 3
ENQ Retries	: 3

1747-KE

Set up the parameters for 1747-KE using the software specifically designed for this purpose.

DF1 Port Setup Menu

Baudrate	: 19200
Bits Per Character	: 8
Parity	: Even
Stop Bits	: 1

DF1 Full-Duplex Setup Parameters

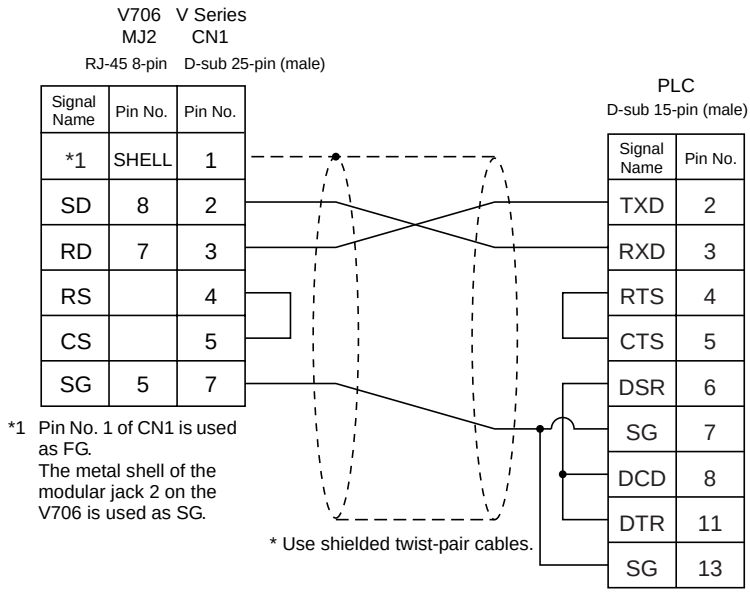
Duplicate Packet Detection	: Enabled
Checksum	: BCC
Constant Carrier Detect	: Disabled
Message Timeout	: 400
Hardware Handshaking	: Disabled
Embedded Response Detect	: Auto Detect
ACK Timeout (×5 ms)	: 90
ENQuiry Retries	: 3
NAK Received Retries	: 3

Wiring

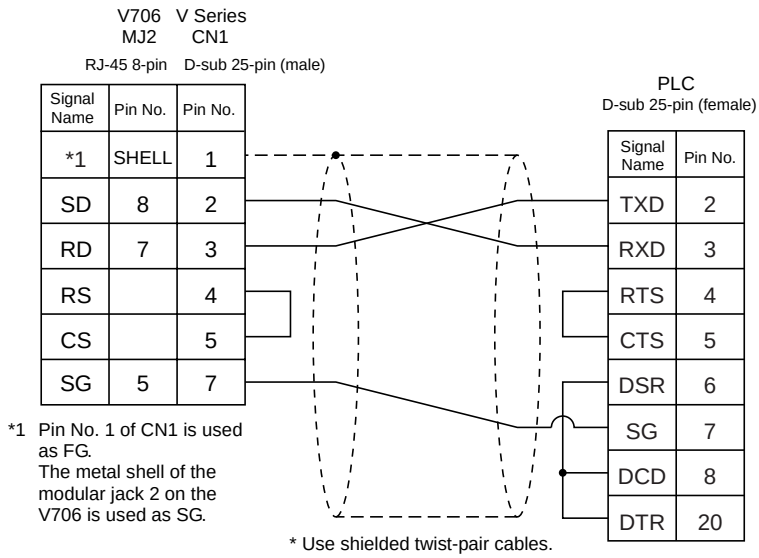
Wiring diagrams with the PLC are shown below.

RS-232C

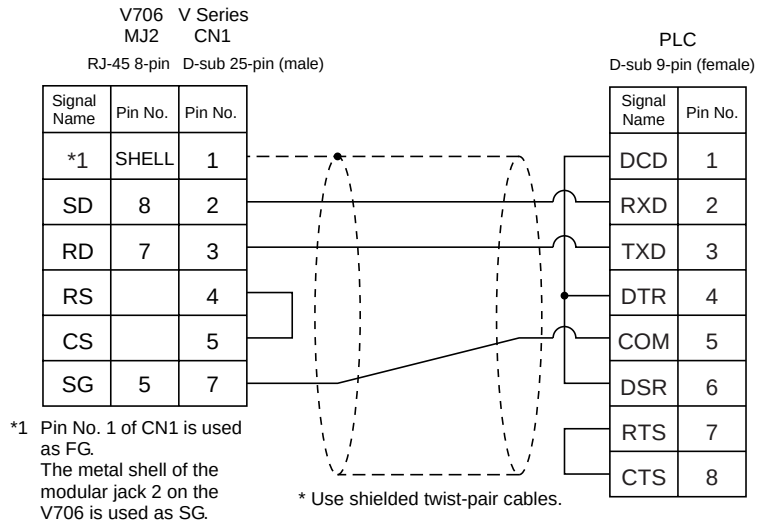
Wiring Diagram 1



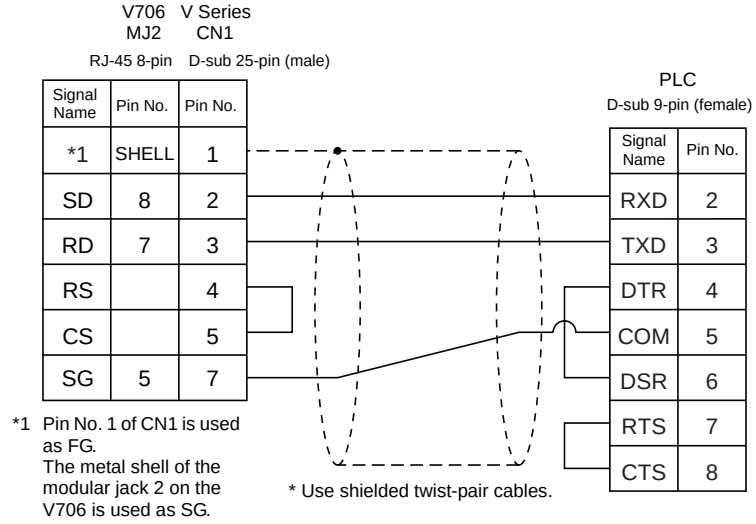
Wiring Diagram 2



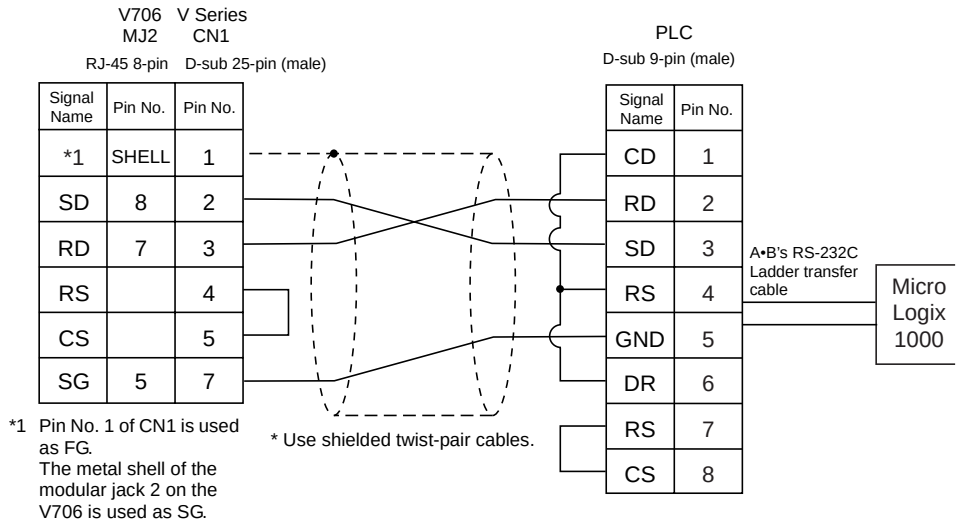
Wiring Diagram 3



Wiring Diagram 4



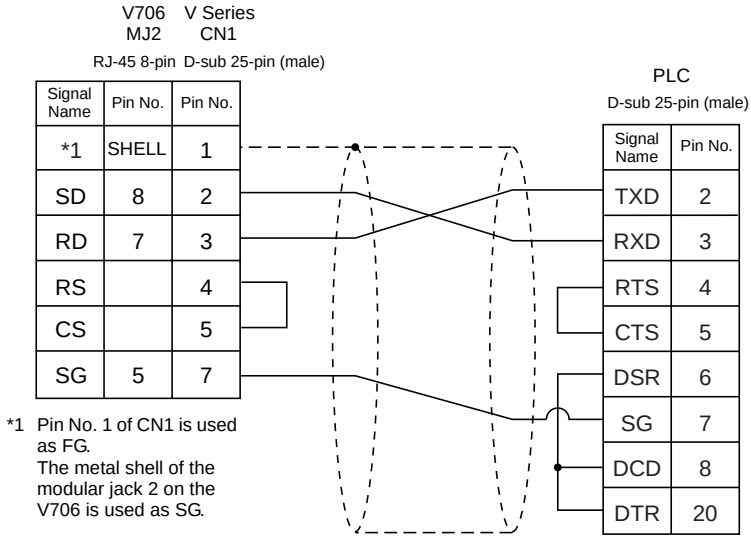
Wiring Diagram 5



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 6



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-422

Wiring Diagram 7

V706 MJ2 RJ-45 8-pin — V Series CN1 D-sub 25-pin (male)

Signal Name	Pin No.	Pin No.
*1	SHELL	1
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25

PLC D-sub 25-pin (female)

Signal Name	Pin No.
RTS	4
CTS	5
DSR	6
DCD	8
TDA	14
RDA	16
RDB	18
DTR	20
TDB	25

*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 8

V706 MJ2 RJ-45 8-pin — V Series CN1 D-sub 25-pin (male)

Signal Name	Pin No.	Pin No.
*1	SHELL	1
SG	5	7
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25

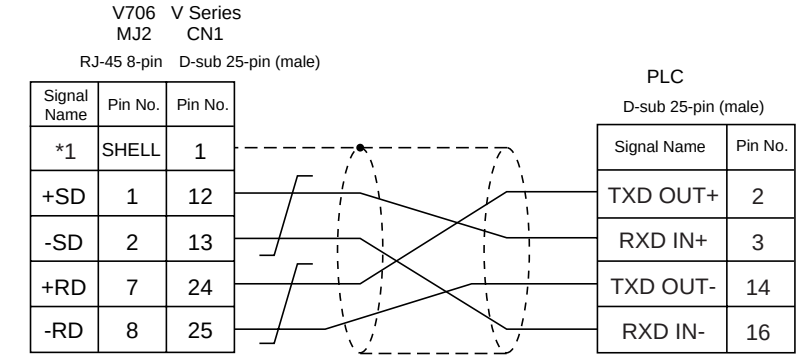
PLC D-sub 9-pin (male)

Signal Name	Pin No.
TXD–	1
RXD–	2
COM	5
RXD+	6
TXD+	9

*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 9



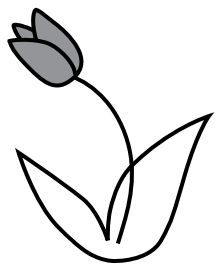
Signal Name	Pin No.	Pin No.
*1	SHELL	1
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25

Signal Name	Pin No.
TXD OUT+	2
RXD IN+	3
TXD OUT-	14
RXD IN-	16

*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

MEMO



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3. Automationdirect PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
Direct LOGIC	D4-430 D4-440	Port 1 on a CPU unit	RS-232C [Wiring Diagram 1] RS-422 [Wiring Diagram 5]		
	D4-450	Port 3 on a CPU unit	RS-485 [Wiring Diagram 6]		
		Port 2 on a CPU unit	RS-232C [Wiring Diagram 2]		
	D2-240	Port 2 on a CPU unit			
	D2-250	Port 2 on a CPU unit	RS-232C [Wiring Diagram 3]		
Direct LOGIC (K-Sequence)	D4-430 D4-440	Port 1 on a CPU unit	RS-232C [Wiring Diagram 1] RS-422 [Wiring Diagram 5]	×	×
	D4-450	Port 0 on a CPU unit	RS-232C [Wiring Diagram 4]		
		Port 3 on a CPU unit	RS-485 [Wiring Diagram 6]		
		Port 2 on a CPU unit	RS-232C [Wiring Diagram 2]		
	D2-240	Port 1 on a CPU unit Port 2 on a CPU unit			
	D2-250	Port 1 on a CPU unit			
		Port 2 on a CPU unit	RS-232C [Wiring Diagram 3]		

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		“0” for ×10, “1” for ×1	1
Parity		Odd	Odd
Transmission code	Data length	8	8
	Stop bit	1	1
Function		Host link system (fixed)	–
Response delay time		0 (fixed)	–
Time-out		None (fixed)	–
ASCII/HEX		HEX (fixed)	–

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

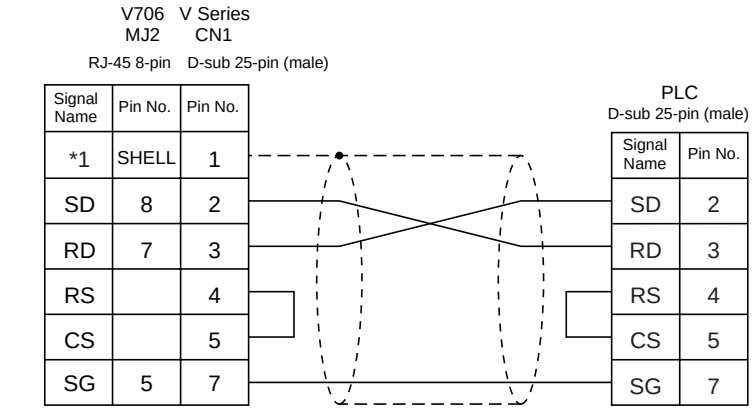
Memory		TYPE	Remarks
V	(data register)	0	
X	(input relay)	1	
Y	(output relay)	2	
C	(internal relay)	3	
S	(stage)	4	
GX	(global inputs)	5	
GY	(global outputs)	6	
T	(timer/contact)	7	
CT	(counter/contact)	8	

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

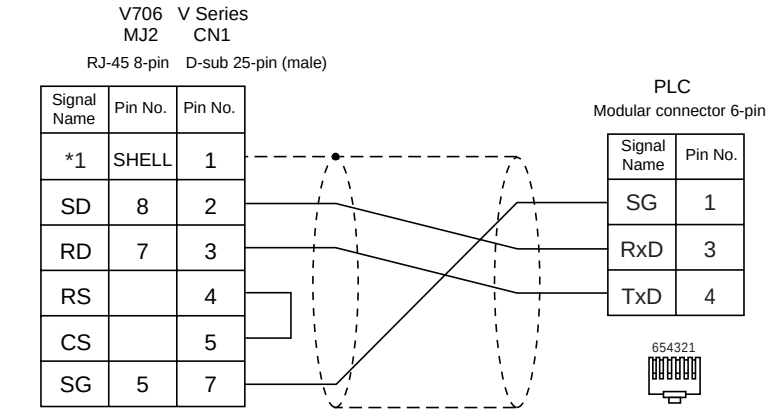
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

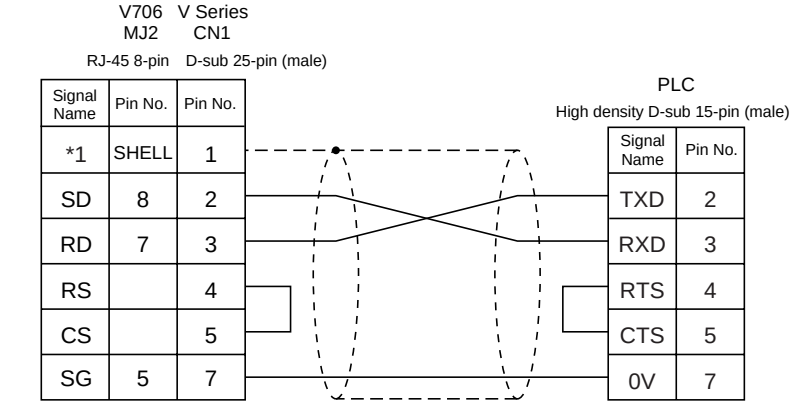
Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

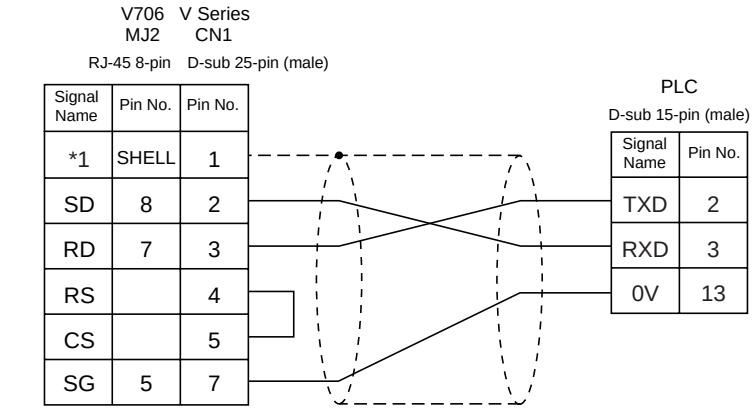
Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 4

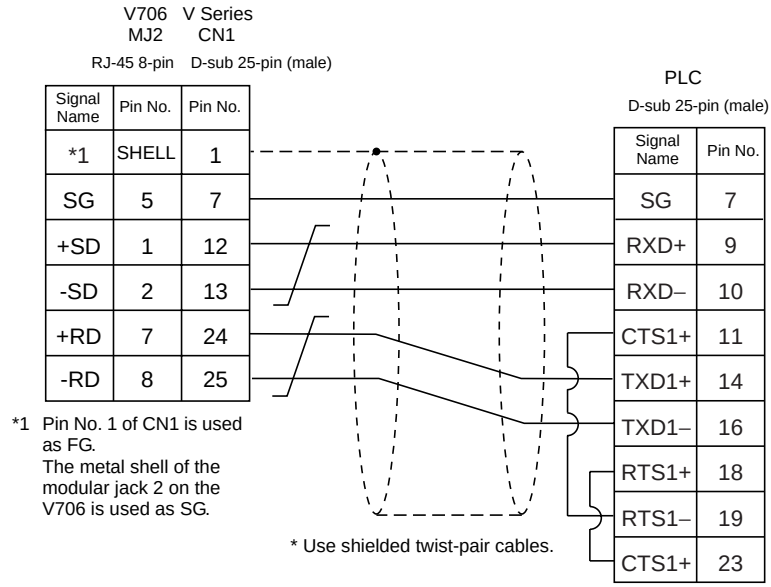


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-422

Wiring Diagram 5



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 6

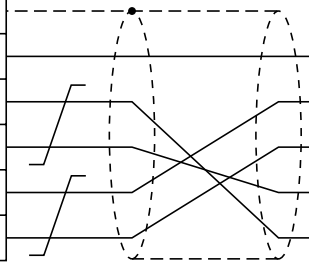
V706 MJ2 (RJ-45 8-pin)

Signal Name	Pin No.	Pin No.
*1	SHELL	1
SG	5	7
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25

V Series CN1 (D-sub 25-pin (male))

PLC
D-sub 25-pin (male)

Signal Name	Pin No.
SG	7
TXD3+	12
TXD3–	13
RXD3+	24
RXD3–	25

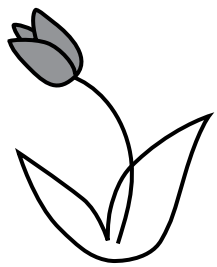


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

In case SU-6M, it is possible to use terminal blocks.

MEMO



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4. Baldor PLC

Available PLCs

Select PLC Type	Unit/Port	Connection	PLC2Way	Ladder Transfer
Mint	NextMove (Comms Data Array)	RS-232C [Wiring Diagram 1]	×	×
	Optimum (Comms Data Array)			

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Port		0	0
Parity		None	None
Transmission code	Data length	8	8
	Stop bit	1	1

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

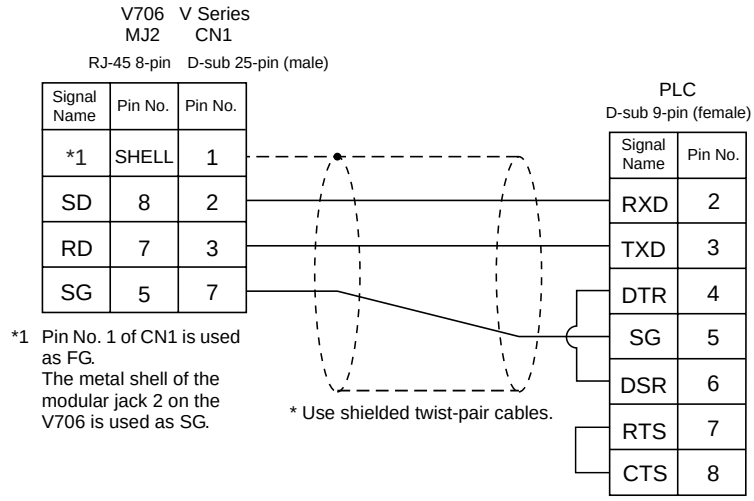
Memory		TYPE	Remarks
I	(Integer)	0	
F	(Float)	1	
B	(Integer omitting decimals)	2	

Wiring

Wiring diagram with the PLC is shown below.

RS-232C

Wiring Diagram 1



5. DELTA PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
DVP series	DVP series	RS-485 Communication port	RS-485 [Wiring Diagram 1]	×	×

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Port		1	1
Parity		Even	Even
Transmission code	Data length	7	7
	Stop bit	1	1

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

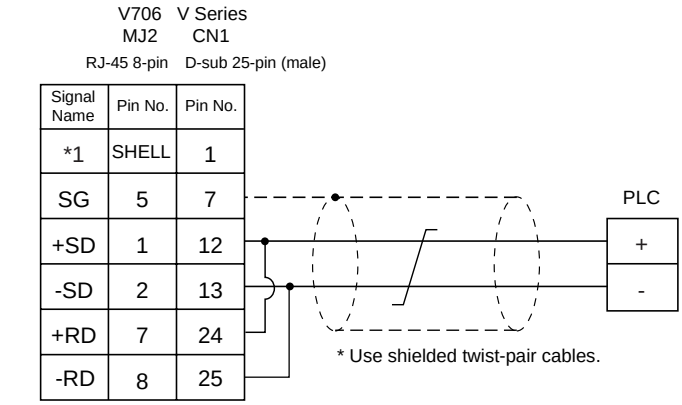
Memory		TYPE	Remarks
D	(data register)	0	
X	(input relay)	1	
Y	(output relay)	2	
M	(auxiliary relay)	3	
S		4	
T	(timer)	5	
C	(counter)	6	
32C	(high-speed counter)	7	

Wiring

Wiring diagram with the PLC is shown below.

RS-485

Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

6. FANUC PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
Power Mate	Power Mate-Model H/D	Port on the CPU unit (JD14)	RS-422 [Wiring Diagram 2]	×	×
	Power Mate i Model H/D	JD42	RS-232C [Wiring Diagram 1]		
		JD40	RS-422 [Wiring Diagram 3]		

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps (fixed)	–
Port		0 (fixed)	–
Parity		Even (fixed)	–
Transmission code	Data length	8 (fixed)	–
	Stop bit	1 (fixed)	–

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

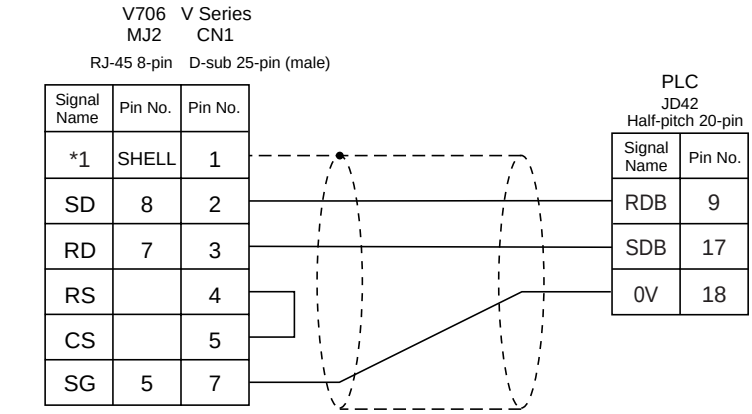
Memory		TYPE	Remarks
D	(data table)	0	
X	(input relay)	1	WX as word device
Y	(output relay)	2	WY as word device
R	(internal relay)	3	WR as word device
K	(keep relay)	4	WK as word device
T	(timer)	5	
C	(counter)	6	

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

Wiring Diagram 1

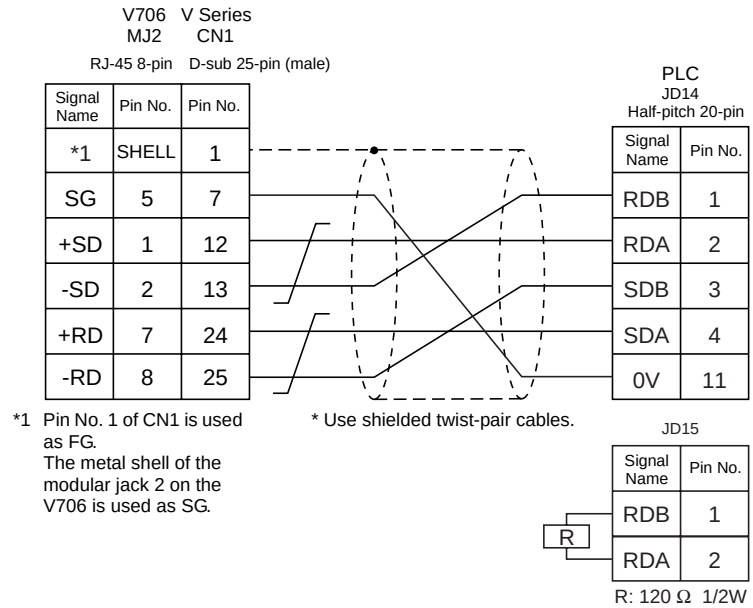


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-422

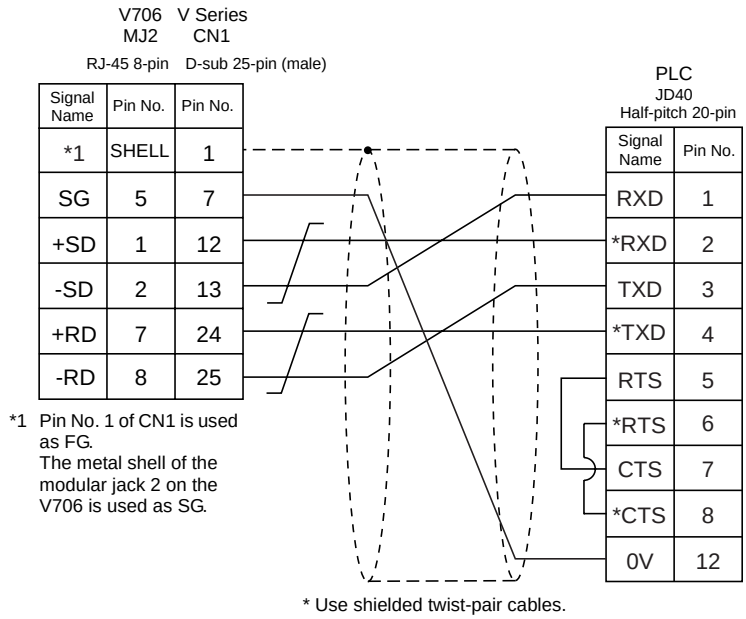
Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

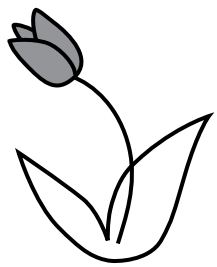
Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

MEMO



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7. FATEK AUTOMATION PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
FACON FB series	FACON FB series	Programming interface	RS-232C [Wiring Diagram 1]	×	×
		FB-DTBR port 1	RS-232C [Wiring Diagram 2]		
		FB-DTBR port 2	RS-422 [Wiring Diagram 3]		

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Parity		Even (fixed)	–
Transmission code	Data length	7 (fixed)	–
	Stop bit	1 (fixed)	–

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

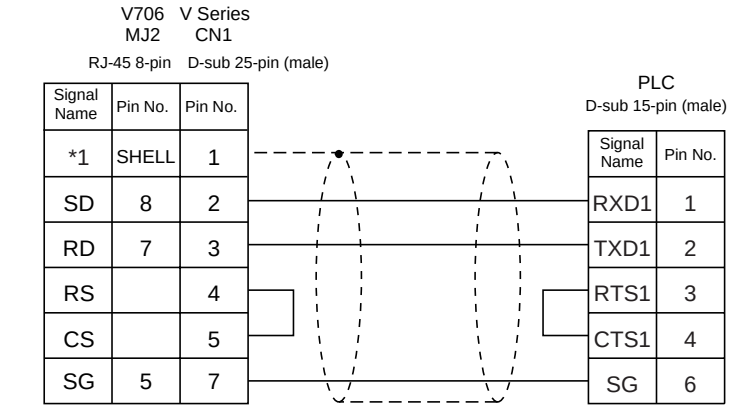
Memory		TYPE	Remarks
HR	(data register)	0	
DR	(data register)	1	
X	(input relay)	2	
Y	(output relay)	3	
M	(internal relay)	4	
S	(step relay)	5	
T	(timer contact)	6	Read only
C	(counter contact)	7	Read only
RT	(timer/current value)	8	
RC	(counter/current value)	9	
DRC	(32-bit counter/current value)	10	

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

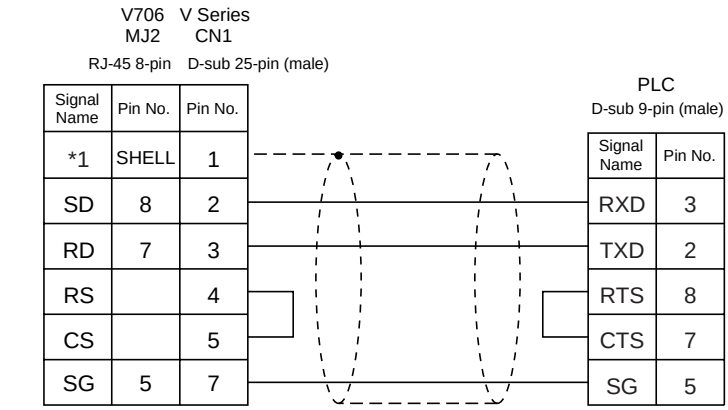
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 2

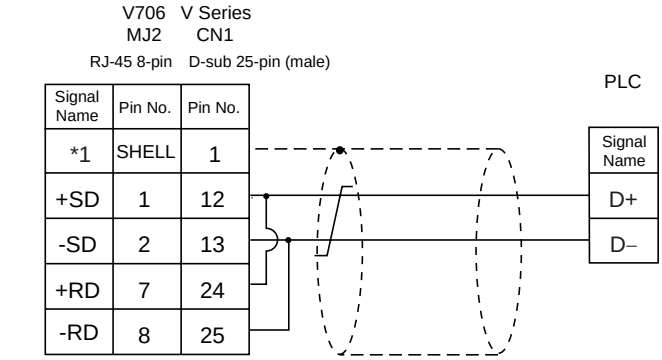


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-422

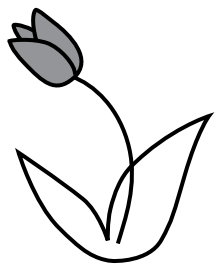
Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

MEMO



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8. Fuji Electric PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer*4
MICREX-F series (MICREX-F series V4)	F55	NV1L-RS2	RS-232C [Wiring Diagram 1]	○	×
	F70, F70S	NC1L-RS2	RS-232C [Wiring Diagram 1]	○	
		NC1L-RS4	RS-485 [Wiring Diagram 4]	○	
	F80H, F120H, F120S F140S, F15XS	FFU120B	RS-232C [Wiring Diagram 1]	○	
		FFK120A	RS-485 [Wiring Diagram 4]	○	
SPB (N mode) and FLEX-PC series*1	NS-CPU-xx	NJ-RS1	RS-232C [Wiring Diagram 1]	○	×
			RS-485 [Wiring Diagram 4]	×	
	NJ-CPU-xx	NJ-RS2	RS-232C [Wiring Diagram 1]	○	
		NJ-RS4	RS-485 [Wiring Diagram 4]	×	
	NBxx	NB-RS1	RS-232C [Wiring Diagram 1]	○	
			RS-485 [Wiring Diagram 4]	×	
	NW0Pxx	NW0LA-RS2	RS-232C [Wiring Diagram 3]	○	
		NW0LA-RS4	RS-485 [Wiring Diagram 4]	×	
SPB (N mode) and FLEX-PC CPU*2	FLEX-PC	CPU port	RS-485 Hakko Electronics' cable "FU-CPUNS"*3	×	○
	NJ-B16	RS-232C port	RS-232C [Wiring Diagram 2]	×	
	NW0Pxx	CPU port	RS-485 Hakko Electronics' cable "FU-CPUNS"*3	×	
FLEX-PC COM(T)	FLEX-PC NJ-JM	Computer link terminal block	RS-422 [Wiring Diagram 5]	×	×

*1 To use FLEX-PC of Toyota version, select [FLEX-PC (T)].
*2 To use FLEX-PC CPU of Toyota version, select [FLEX-PC CPU (T)].
*3 For connection to MJ2 of a V706, use an MJ2-PLC adaptor plus FU-CPUNS.
*4 For the ladder transfer function, refer to "Appendix 8 Ladder Transfer Function."

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

MICREX-F Series, SPB (N Mode) & FLEX-PC Series

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		0	0
Parity		Even	Even
Transmission mode	RS-232C	1 (asynchronous non-protocol by command) (fixed)*1	–
	RS-422	3 (asynchronous non-protocol by command) (fixed)*1	–
Transmission code	Data length	7 (ASCII)	7
	Stop bit	1	1
Terminating resistance at receiver		Provided for RS-485	–

*1 In the case of the SPB (N mode), select [General Command Asyn] for the communication interface setting (PLC Functions → System Parameters → General Communication) on the PLC loader.

SPB (N Mode) & FLEX-PC CPU Port

Connect to the CPU port. Communication parameters for the V7 series are automatically set.

FLEX-PC COM (T) (NJ Computer Link) Toyota Version

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		0	0
Parity		Even	Even
Transmission code	Data length	7	7
	Stop bit	2	2

MICREX-F Series, SPB (N Mode) & FLEX-PC Series: Switch Setting

MODE switch: RS-232C: 1 RS-485: 3
RS-485 Port Setting SW: "0" for both ×10, ×1
RS-485 terminating resistance: ON
Character switches

No	Setting	Contents
8	ON	Switch Setting
7	ON	With parity
6	ON	Even
5	ON	7 bits
4	ON	1 bit
3	ON	Same as that set on V7 (normally 19200 bps)
2	ON	
1	OFF	

* In the case of the SPB (N mode), set it on the PLC loader.

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

MICREX-F Series

Memory		TYPE	Remarks
M	(auxiliary relay)	0	WM as word device
K	(keep relay)	1	WK as word device
B	(input/output relay)	2	WB as word device
L	(link relay)	9	WL as word device
F	(special relay)	10	WF as word device
TS	(timer/set value)	11	*1
TR	(timer/current value)	12	*1
W9	(timer/current value 0.1)	13	*1
CS	(counter/set value)	14	*1
CR	(counter/current value)	15	*1
BD	(data memory)	16	*1
WS	(step control relay)	17	*2
Wn	(file memory)	18	*3, *4

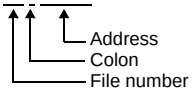
*1 For numerical data format where double-words can be used (Num. Data Display, Graph, Sampling), data is processed as double-words.
For those where bits or words can be used, data is processed as words consisting of lower 16 bits.
For input: Upper 16 bits are ignored.
For output: “0” is written for upper 16 bits.

*2 Byte device such as step relay is processed as described below.
For input: Upper 8 bits are “0.”
For output: Lower 8 bits are written.

*3 To set up the file memory on the V-SFT editor, enter “file number” + “: (colon)” + “address” in order.

*4 Define the file area as “SI.”

Example: W30 : 00002



* Notes on V4 (or GD-80) data conversion
When converting data of V4 (or GD-80) into the V7 data, [MICREX-F series V4] is automatically selected for the PLC type.

SPB (N Mode) & FLEX-PC Series, SPB (N Mode) & FLEX-PC CPU Port

Standard Memory		Toyota Version	TYPE	Remarks
D	(data register)	D	0	
W	(link register)	R	1	
M	(internal relay)	M	2	WM as word device
L	(latch relay)	K	3	WL (WK) as word device
X	(input relay)	X	4	WX as word device
Y	(output relay)	Y	5	WY as word device
R	(file register)	W	6	
TN	(timer/current value)	TN	7	
CN	(counter/current value)	CN	8	
T	(timer/contact)	T	9	
C	(counter/contact)	C	10	
WS	(step relay)	Not provided	11	

FLEX-PC COM (T) (NJ Computer Link) Toyota Version

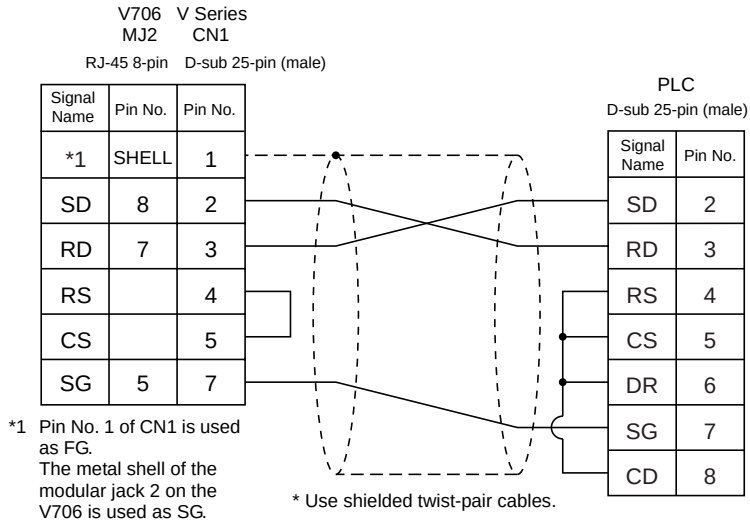
Memory		TYPE	Remarks
D	(data register)	0	
R	(link register)	1	
M	(internal relay)	2	WM as word device
K	(latch relay)	3	WK as word device
X	(input relay)	4	WX as word device
Y	(output relay)	5	WY as word device
W	(file register)	6	
TN	(timer/current value)	7	
CN	(counter/current value)	8	
T	(timer/contact)	9	
C	(counter/contact)	10	
Z	(special register)	12	
V	(special relay)	13	WV as word device

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

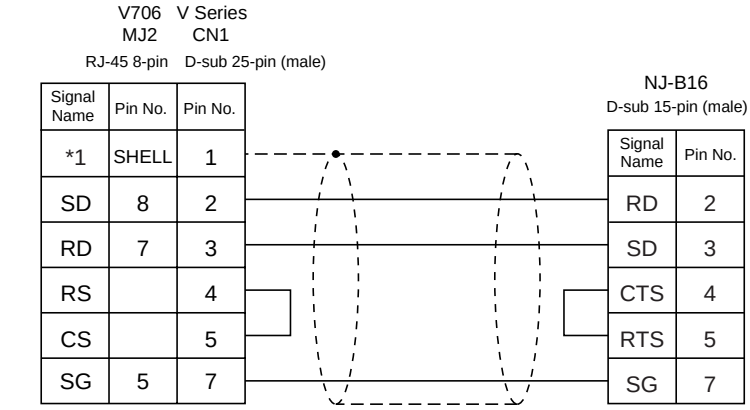
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

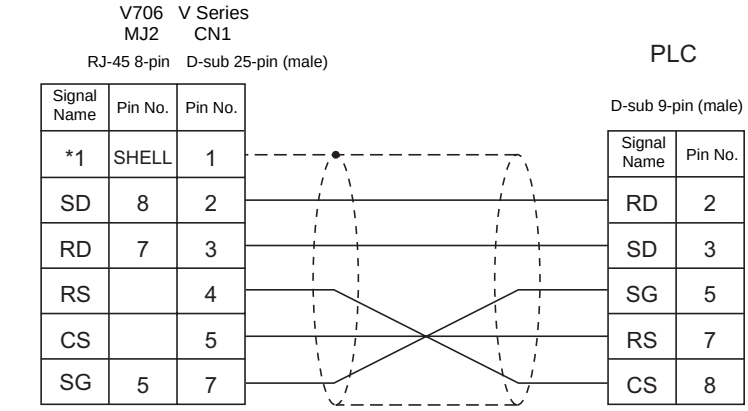
Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 3

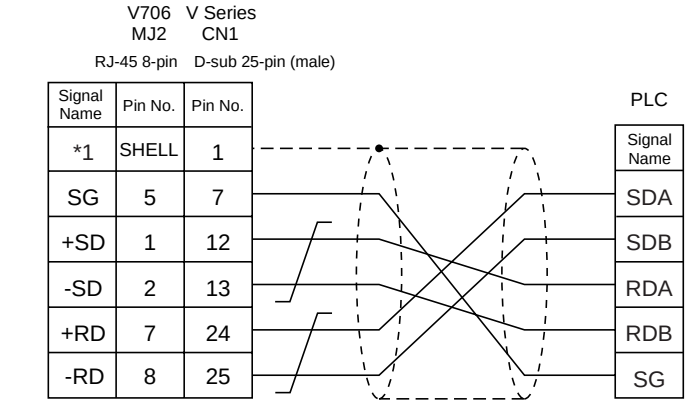


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-485

Wiring Diagram 4

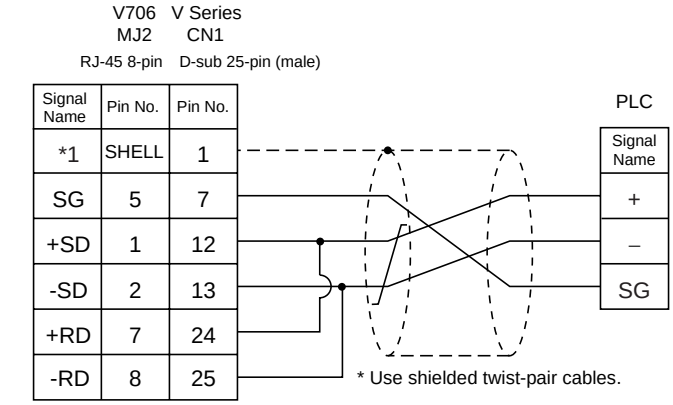


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

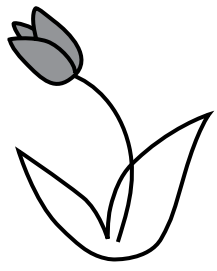
RS-422

Wiring Diagram 5



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

MEMO



Please use this page freely.

9. GE Fanuc PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
90 series	Series 90-30	Programmable coprocessor (PCM)	RS-232C [Wiring Diagram 1] RS-485 [Wiring Diagram 2]	×	×
90 series (SNP-X)	Series 90 micro Series 90-30	CPU port	RS-485 [Wiring Diagram 3]		

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

90 Series

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		01 (“0” for ×10, “1” ×1)	0
Parity		Odd	Odd
Transmission code	Data length	8	8
	Stop bit	1	1
Functions		Host link function (fixed)	–
Response delay time		0 (fixed)	–
Timeout		None (fixed)	–
ASCII/HEX		HEX (fixed)	–

90 Series SNP-X

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Parity		Odd	Odd
Transmission code	Data length	8	8
	Stop bit	1	1
Functions		SNP-X (fixed)	–

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

90 Series

Memory		TYPE	Remarks
R	(data register)	0	
I	(input)	1	
Q	(output)	2	

90 Series SNP-X

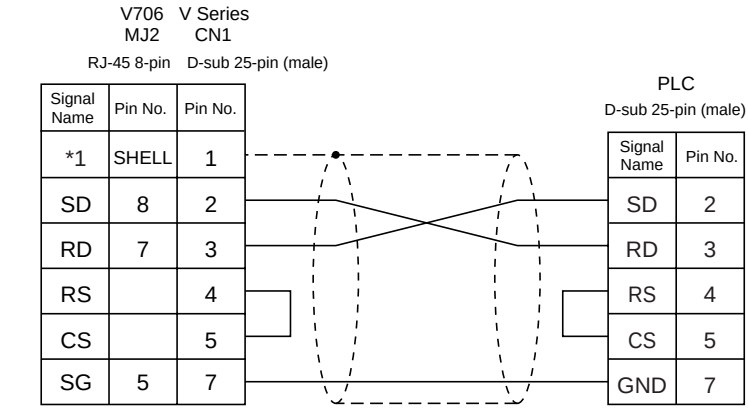
Memory		TYPE	Remarks
R	(data register)	0	
I	(input)	1	
Q	(output)	2	
M	(internal relay)	3	
G	(global relay)	4	
AI	(analog input)	5	
AQ	(analog output)	6	
T	(temporary memory relay)	7	
S	(system status)	8	Read only
SA	(system status)	9	
SB	(system status)	10	
SC	(system status)	11	

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

Wiring Diagram 1

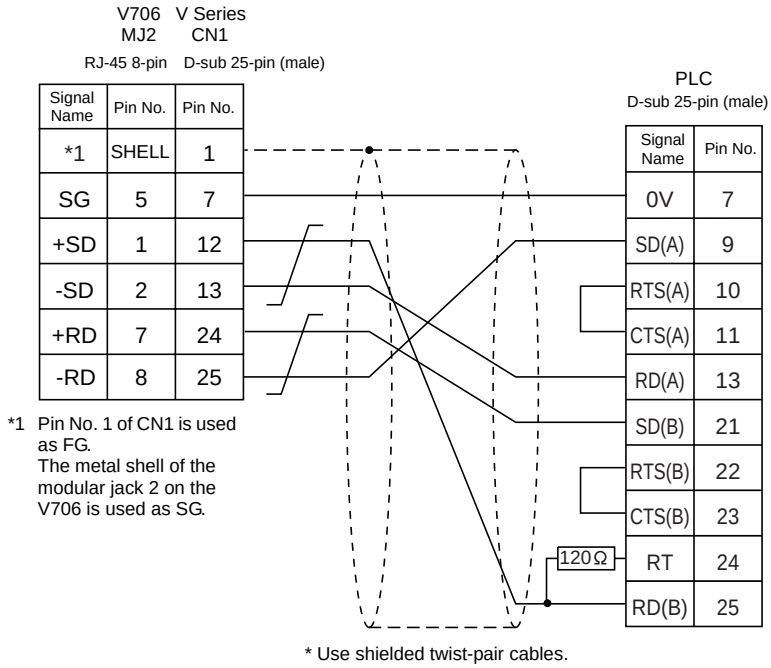


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-485

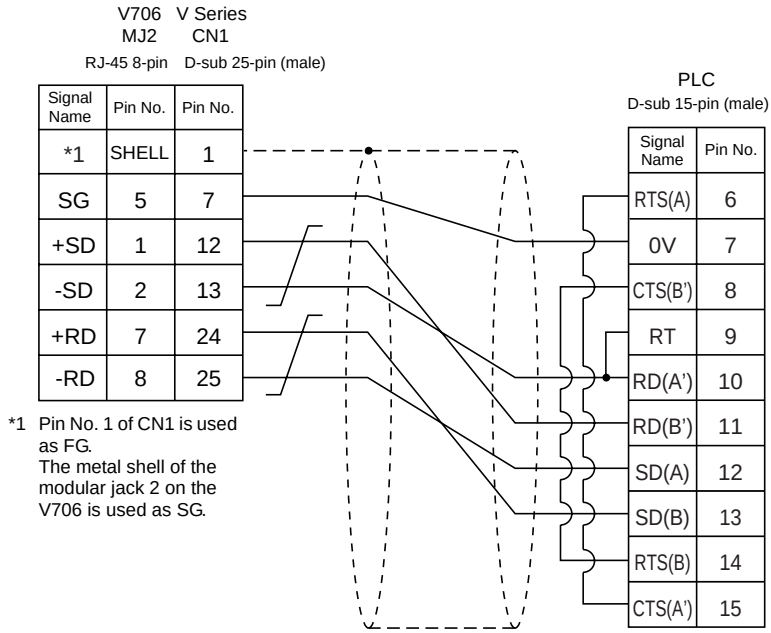
Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

10. Hitachi PLC

Available PLCs

Select PLC Type	PLC	Unit/Port		Connection	PLC2Way	Ladder Transfer*4
HIDIC-H	HIDIC H series	COMM-2H		RS-232C [Wiring Diagram 1] RS-422 [Wiring Diagram 5]	×	×
		Peripheral port on the CPU module		RS-232C [Wiring Diagram 1]		
		On H-252C CPU module	PERIPHERAL 1	RS-232C [Wiring Diagram 1]		
			PERIPHERAL 2	RS-232C [Wiring Diagram 1] + Hitachi's cable "CNCOM-05"*1		
	EH150	On CPU module	PORT1 PORT2	RS-232C [Wiring Diagram 1] + Hitachi's cable "EH-RS05"*1		
HIDIC-EHV	EHV	CPU module	SERIAL	RS-232C [Wiring Diagram 4] RS-422 [Wiring Diagram 8]	×	
HIDIC-S10/2α, S10mini	S10 2α	Interface on the CPU unit		RS-422 [Wiring Diagram 6]	△ *3	
	S10 mini	RS-232C connector on the CPU unit		RS-232C [Wiring Diagram 2]	○	
		LQE060		RS-232C [Wiring Diagram 3]		
HIDIC-S10/4α	S10 4α	LWE805		RS-422 [Wiring Diagram 6]	△ *3	
HIDIC-S10/ABS	ABS*2	-		RS-422 [Wiring Diagram 6]	×	
HIDIC-S10V	S10V CPU	LQP510		RS-422 [Wiring Diagram 7]		

*1 When using the Hitachi's cable "EH-RS05" or "CNCOM-05", connect the cable shown in [Wiring Diagram 1] to the D-sub 15-pin side for communications with the V7 series.
*2 Specify the absolute memory address. For more information, refer to the instruction manual for the PLC.
*3 For more detail, contact your local distributor.
*4 For the ladder transfer function, refer to "Appendix 8 Ladder Transfer Function."

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

HIDIC-H

COMM-2H

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		0 for both ST No ×10, ×1	0
Parity		Even	Even
Transmission mode	RS-232C	MODE7	Protocol 2 with port
		MODE1	Protocol 1 without port
		MODE2	Protocol 1 with port
		MODE9	Protocol 2 without port
	RS-422	MODE9	Protocol 2 with port
		MODE2	Protocol 1 with port*1
Transmission code	Data length	7 (ASCII)	7
	Stop bit	1	1
Sumcheck		Provided (fixed)	–

*1 Multi-link connection is not available.

CPU Module Peripheral Port, EH-150 Port 1/2

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Signal level		RS-232C	RS-232C
Port		0	0
Parity		Even (fixed)	Even (fixed)
Transmission code	Data length	7 (ASCII) (fixed)	7 (fixed)
	Stop bit	1 (fixed)	1 (fixed)
Sumcheck		Provided (fixed)	–
Port operation		Dedicated port	–
Communication control protocol		Transmission control protocol 1	Protocol 1 without port

HIDIC-EHV

CPU Module SERIAL Port

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		38400 bps	38400 bps
Port		0	0
Transmission code	Parity	-	Even (fixed)
	Data length	-	7 (fixed)
	Stop bit	-	1 (fixed)
Port operation		Dedicated port	–
Communication protocol	RS-232C	protocol 1 (1:1)	Protocol 1 without port
		protocol 2 (1:1)	Protocol 2 without port
	RS-422	protocol 1 (1:1)	Protocol 1 without port
		protocol 1 (1:n)	Protocol 1 with port
		protocol 2 (1:1)	Protocol 2 without port
		protocol 2 (1:n)	Protocol 2 with port
Send delay time		-	2 msec over

HIDIC-S10/2α, HIDIC-S10/4α

Item	Setting on PLC	V7 Comm. Parameter Setting
Baud rate	7	19200 bps

HIDIC-S10V

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps (fixed)	19200 bps (fixed)
Parity		Odd (fixed)	Odd (fixed)
Transmission mode		RS-422 (fixed)	RS-422 (fixed)
Transmission code	Data length	8 (fixed)	8 (fixed)
	Stop bit	1 (fixed)	1 (fixed)

Switch Setting

COMM-2H

Baud rate: 19200 bps
MODE switch: To connect to both RS-232C and RS-422, set MODE switch to 9.
RS-232C (protocol 2 w/o port) RS-422 (protocol 2 with port)
ST No switch: “0” for both ×10, ×1
DIP switch

Switch	Setting	Contents
1	OFF	Bit length 7
2	OFF	Same as that set on V7 (normally 19200 bps)
3	ON	
4	ON	
5	ON	With parity
6	ON	Even
7	OFF	Stop bit 1
8	ON	With sumcheck

EH-150 PORT1

DIP SW	Setting	Contents
3	ON	19200 bps
4	OFF	
5	ON	Dedicated port

Special Internal Output	Setting	Contents
WRF037	H0000	Transmission control protocol 1, without port, RS-232C

EH-150 PORT2

DIP SW	Setting	Contents
6	OFF	19200

Special Internal Output	Setting	Contents
WRF037	H0000	Transmission control protocol 1, without port, RS-232C

* Turn on (PHL High) the port switch.

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

HIDIC-H

Memory		TYPE	Remarks
WR	(internal word output)	0	
X	(external bit input)	1	WX as word device
Y	(external bit output)	2	WY as word device
L	(bit CPU link area)	3	WL as word device
M	(bit data area)	4	WM as word device
TC	(timer counter/elapsed time)	5	
R	(relay)	6	
TD	(timer counter/contact)	7	
WN	(network input/output)	8	

HIDIC-EHV

Memory		TYPE	Remarks
WR	(internal word output)	0	
X	(external bit input)	1	WX as word device
Y	(external bit output)	2	WY as word device
L	(bit CPU link area)	3	WL as word device
M	(bit data area)	4	WM as word device
TC	(timer counter/elapsed time)	5	
R	(relay)	6	
TD	(timer counter/contact)	7	
WN	(network input/output)	8	
CL	(count clear)	9	
EX	(extensional bit input)	11	WEX as word device
EY	(extensional bit output)	12	WEY as word device

HIDIC-S10/2α, S10mini, HIDIC-S10/4α

Memory		TYPE	Remarks
FW	(work register)	0	
X	(input relay)	1	XW as word device
Y	(output relay)	2	YW as word device
R	(internal relay)	3	RW as word device
G	(global link)	4	GW as word device
K	(keep relay)	5	KW as word device
T	(on-delay timer contact)	6	TW as word device
U	(one-shot timer contact)	7	UW as word device
C	(up/down counter contact)	8	CW as word device
TS	(on-delay timer set value)	9	
TC	(on-delay timer elapsed value)	10	
US	(one-short timer set value)	11	
UC	(one-shot timer elapsed value)	12	
CS	(up/down counter set value)	13	
CC	(up/down counter elapsed value)	14	
DW	(data register)	15	
E	(event register)	16	EW as word device
S	(system register)	17	SW as word device
J	(transfer register)	18	JW as word device
Q	(receive register)	19	QW as word device
M	(extensional internal register)	20	MW as word device

HIDIC-S10/ABS

Memory	TYPE	Remarks
0E	0	
06	1	
18	2	
19	3	
1A	4	
1B	5	
1C	6	
1D	7	

HIDIC-S10V

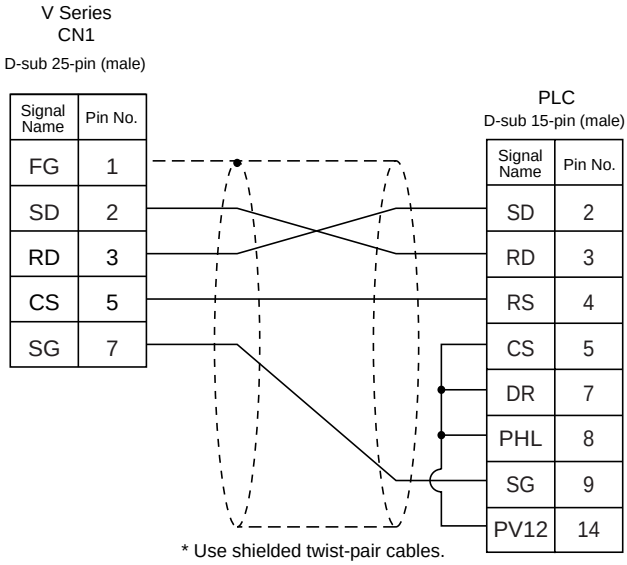
Memory		TYPE	Remarks
FW	(work register)	0	
X	(input relay)	1	XW as word device
Y	(output relay)	2	YW as word device
R	(internal relay)	3	RW as word device
G	(global link relay)	4	GW as word device
K	(keep relay)	5	KW as word device
T	(on-delay timer contact)	6	TW as word device
U	(one-shot timer contact)	7	UW as word device
C	(up/down counter contact)	8	CW as word device
TS	(on-delay timer set value)	9	
TC	(on-delay timer elapsed value)	10	
US	(one-shot timer set value)	11	
UC	(one-shot timer elapsed value)	12	
CS	(up/down counter set value)	13	
CC	(up/down counter elapsed value)	14	
DW	(data register)	15	
E	(event register)	16	EW as word device
S	(system register)	17	SW as word device
J	(transfer register)	18	JW as word device
Q	(receive register)	19	QW as word device
M	(extensional internal register)	20	MW as word device
LB	(work register)	21	LBW as word device
LR	(work register 1 for ladder converter)	22	LRW as word device
LV	(work register 2 for ladder converter)	23	LVW as word device
LLL	(long-word work register)	24	Double-word
LFF	(floating-point work register)	25	
LWW	(word work register)	26	
LML	(long-work word register) Backup area	27	Double-word
LGF	(floating-point work register) Backup area	28	
LXW	(word work register) Backup area	29	
A	(extensional internal register)	30	AW as word device, Ethernet communication only
N	(nesting coil)	31	NW as word device, Ethernet communication only
P	(process coil)	32	PW as word device, Ethernet communication only
V	(edge coil)	33	VW as word device, Ethernet communication only
Z	(z register)	34	ZW as word device, Ethernet communication only
IW	(extensional input)	35	Ethernet communication only
OW	(extensional output)	36	Ethernet communication only
BD	(special internal register)	37	Ethernet communication only

Wiring

Wiring diagrams with the PLC are shown below.

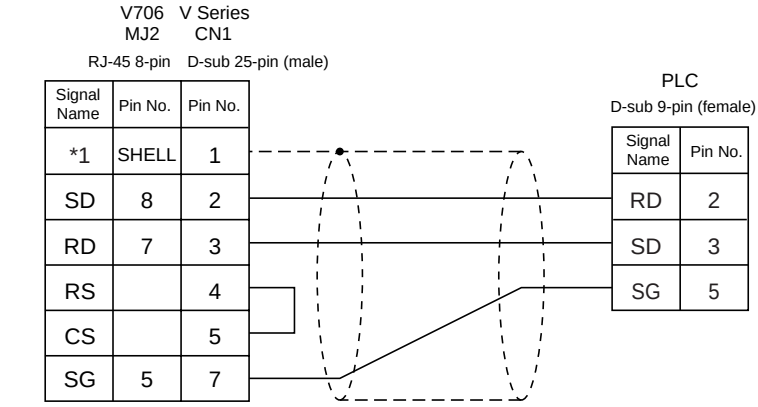
RS-232C

Wiring Diagram 1



* Use shielded twist-pair cables.

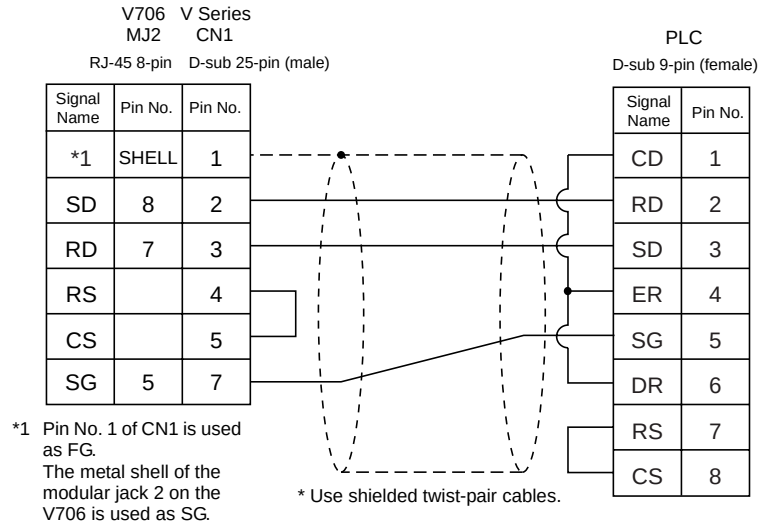
Wiring Diagram 2



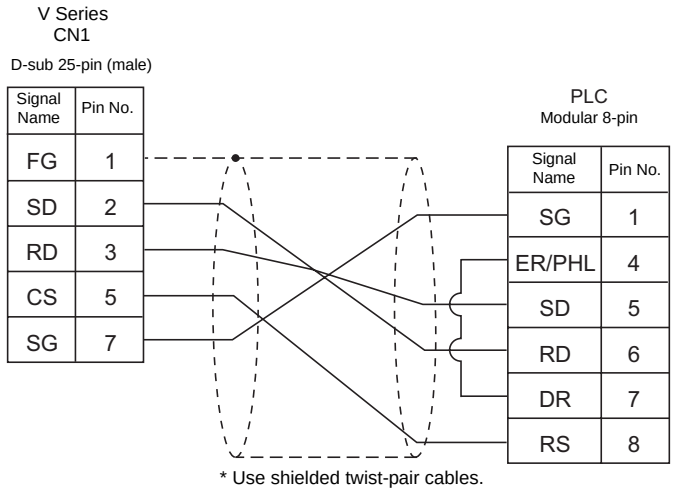
*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 3



Wiring Diagram 4

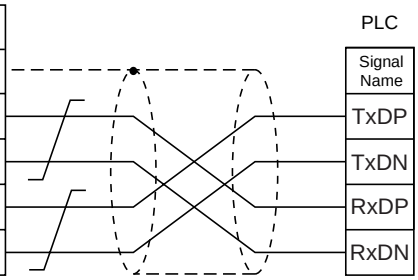


RS-422

Wiring Diagram 5

V706 MJ2 RJ-45 8-pin — V Series CN1 D-sub 25-pin (male)

Signal Name	Pin No.	Pin No.
*1	SHELL	1
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

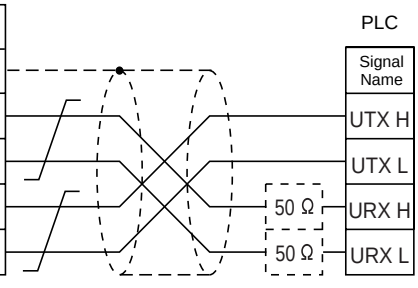
* Use shielded twist-pair cables.

Wiring Diagram 6

When connecting to the S10xα series, add a resistor of 50 Ω (1/2 W) as shown below.

V706 MJ2 RJ-45 8-pin — V Series CN1 D-sub 25-pin (male)

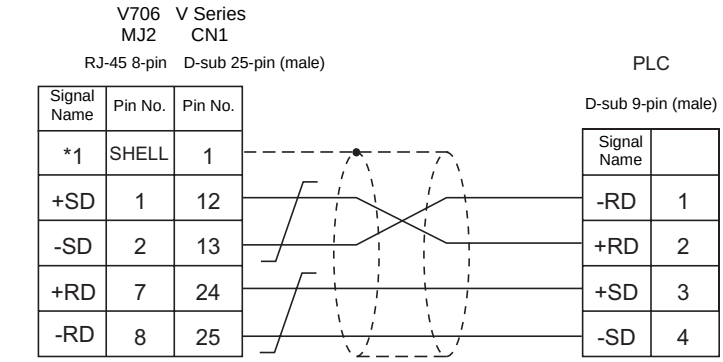
Signal Name	Pin No.	Pin No.
*1	SHELL	1
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

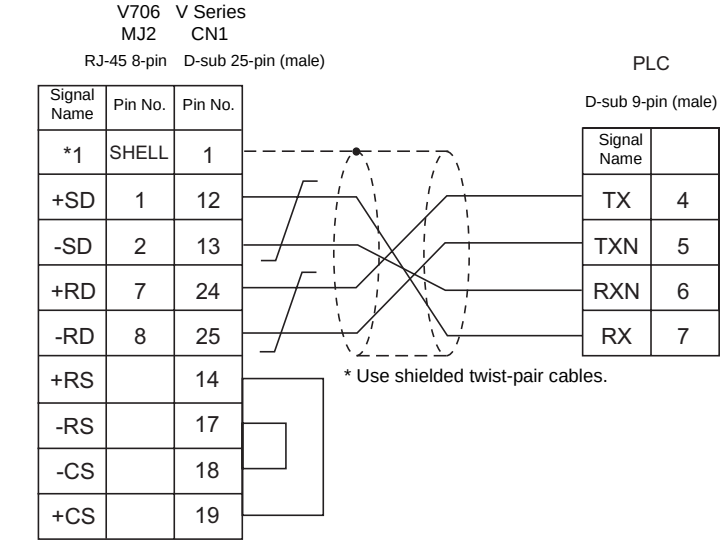
Wiring Diagram 7



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 8

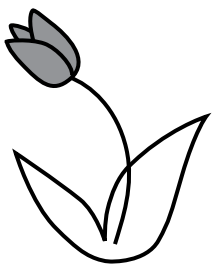


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

When “RS-422, Protocol 1 without port” is selected in the [Communication Parameters]: Install a jumper between pins +RS and +CS and between pins -RS and -CS of D-sub 25-pin. MJ2 of V706 cannot be connected in this mode.

MEMO



Please use this page freely.

11. IDEC PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
MICRO3	MICRO3	Loader port	RS-232C IDEC cable “FC2A-KC1” or IDEC cable “FC2A-KC1” * + [Wiring Diagram 1]	×	×
MICRO Smart	MICRO Smart	Loader port	RS-232C IDEC cable “FC2A-KC4C” + [Wiring Diagram 1]		

* When using RS-232C cable “FC2A-KC2” made by IDEC, connect the cable shown in [Wiring Diagram 3] to the D-sub 9-pin side of the FC2A-KC2 cable for communications with the V7 series.

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Port		1	1
Parity		Even	Even
Transmission code	Data length	7	7
	Stop bit	1	1

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

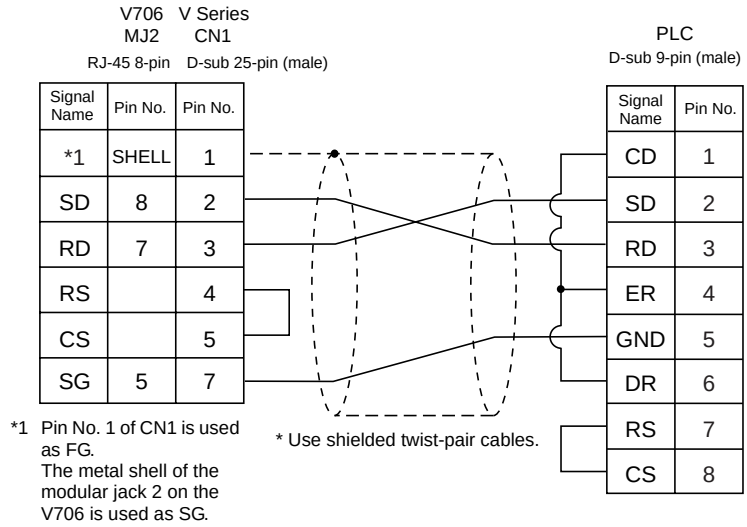
Memory		TYPE	Remarks
D	(data register)	0	
I	(input)	1	
Q	(output)	2	
M	(internal relay)	3	
R	(shift register)	4	
TS	(timer/set value)	5	
TN	(timer/enumerated value)	6	
T	(timer/contact)	7	Read only
CS	(counter/set value)	8	
CN	(counter/enumerated value)	9	
C	(counter/contact)	10	Read only

Wiring

Wiring diagram with the PLC is shown below.

RS-232C

Wiring Diagram 1



12. KEYENCE PLC

Available PLCs

<table>
<tr><th>Select PLC Type</th><th>PLC</th><th>Unit/Port</th><th>Connection</th><th>PLC2Way</th><th>Ladder Transfer</th></tr>
<tr><td>KZ series link</td><td>KZ300
KZ350</td><td>KZ-L2</td><td>Port 1
RS-232C[Wiring Diagram 1]
Port 2
RS-232C[Wiring Diagram 2]
RS-422[Wiring Diagram 7]</td><td rowspan="5">×</td><td rowspan="12">×</td></tr>
<tr><td>KZ-A500CPU</td><td rowspan="2">KZ-A500</td><td>CPU modular port</td><td>RS-232C[Wiring Diagram 3]
RS-422
KEYENCE's cable "KZ-C20"
+
Hakko Electronics' cable
"MB-CPUQ"*1</td></tr>
<tr><td>MITSUBISHI A series link</td><td>KZ-L10</td><td>Port 1
RS-232C[Wiring Diagram 4]
Port 2
RS-232C[Wiring Diagram 2]
RS-422[Wiring Diagram 7]</td></tr>
<tr><td>KZ/KV series CPU</td><td>KZ-10, 16, 24, 40, 80, 300, 350*2
KZ/KV series*3</td><td>CPU modular port</td><td rowspan="4">RS-232C[Wiring Diagram 5]
or
KEYENCE's cable "OP-26487"
+
KEYENCE's connector
"OP-26485"</td></tr>
<tr><td>KZ24/300CPU</td><td>KZ-24, 300*2</td><td>CPU modular port</td></tr>
<tr><td>KV10/24CPU</td><td>KV-10, 24*3</td><td>CPU modular port</td><td rowspan="3">○</td></tr>
<tr><td rowspan="2">KV-700</td><td rowspan="2">KV-700</td><td>CPU modular port</td></tr>
<tr><td>KV-L20
KV-L20R</td><td>Port 1
RS-232C[Wiring Diagram 6]
Port 2
RS-232C[Wiring Diagram 2]</td></tr>
<tr><td rowspan="2">KV-1000</td><td rowspan="2">KV-1000</td><td>Port 2
RS-422[Wiring Diagram 7]</td><td>×</td></tr>
<tr><td>CPU modular port</td><td>RS-232C[Wiring Diagram 5]
or
KEYENCE's cable "OP-26487"
+
KEYENCE's connector
"OP-26485"</td><td>○</td></tr>
<tr><td rowspan="2">KV-L20R</td><td>Port 1
RS-232C[Wiring Diagram 6]
Port 2
RS-232C[Wiring Diagram 2]</td><td>○</td></tr>
<tr><td>Port 2
RS-422[Wiring Diagram 7]</td><td>×</td></tr>
</table>

*1 For connection to MJ2 of a V706, use an MJ2-PLC adaptor plus KZ-C20 and MB-CPUQ.
*2 To connect KZ-24, 300 via RS-232C, select [KZ24/300CPU] for the PLC type on the V-SFT editor.
*3 To connect KZ-10, 24 via RS-232C, select [KV10, 24CPU] for the PLC type on the V-SFT editor.

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

KZ Series Link

Item		Setting on PLC*1	V7 Comm. Parameter Setting
Port		0	0
Baud rate		19200 bps	19200 bps
Parity		Even	Even
Transmission code	Data length	7 (ASCII)	7
	Stop bit	2	2
Terminating resistance		ON for RS-422	–
Operation mode		Link mode	–

*1 Set the port with the port setting switch, the terminating resistance with terminator, and the baud rate/data bit/parity/stop bit with SET B DIP switches.

KZ-A500 CPU (CPU Modular Port)

Item		Setting on PLC	V7 Comm. Parameter Setting
Port		0	0
Baud rate		9600 bps	9600 bps*1
Parity		Odd	Odd
Transmission code	Data length	8	8
	Stop bit	1	1
Terminating resistance		ON for RS-422	–

*1 For signal level RS-422, baud rate is fixed to 9600 bps.

MITSUBISHI A Series Link (Link Unit KZ-L10)

Item		Setting on PLC*1	V7 Comm. Parameter Setting
Port		0	0
Baud rate		19200 bps	19200 bps
Parity		Even	Even
Transmission code	Data length	7	7
	Stop bit	1	1
Sumcheck		Provided (fixed)	–
Terminating resistance		ON for RS-422	–
Communication type		Normal communication	–
Transmission mode		Protocol code 1	Trans. Mode 1

*1 Set the port with the port setting switch, the terminating resistance with terminator, and the baud rate/ data bit/parity/stop bit with SET B DIP switches.
For more information, refer to the instruction manual for KZ-L10.

KZ/KV Series CPU

Communication parameters for the V7 series are automatically set.

KZ24/300 CPU

Item		Setting on PLC	V7 Comm. Parameter Setting
Port		0	0
Baud rate		38400 bps	38400 bps*1
Parity		Even	–
Transmission code	Data length	8	–
	Stop bit	1	–

*1 Maximum baud rate available is 38400 bps. If a higher baud rate is selected, communications are performed at 9600 bps.

KV10/24 CPU

Item		Setting on PLC	V7 Comm. Parameter Setting
Port		0	0
Baud rate		57600 bps	57600 bps*1
Parity		Even	–
Transmission code	Data length	8	–
	Stop bit	1	–

*1 Maximum baud rate available is 57600 bps. If a higher baud rate is selected, communications are performed at 9600 bps.

KV-700/KV-1000

Item		Setting on PLC*2	V7 Comm. Parameter Setting
Port		0	0
Baud rate*1		9600 bps	9600 bps
Parity		Even	–
Transmission code	Data length	8	–
	Stop bit	1	–

*1 Maximum baud rate available is 57600 bps for KV-700 and 115 kbps for KV-1000.
Select the appropriate baud rate depending on the used PLC and environment.
*2 When using KV-L20R, select [Unit Setting] → [Operation Mode] → [KV BUILDER/KV STUDIO Mode] on the ladder tool software.

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

KZ Series Link

Memory		TYPE	Remarks
DM	(data memory)	0	
CH	(input/output relay)	1	

KZ-A500 CPU, MITSUBISHI A Series Link

Memory		TYPE	Remarks
D	(data register)	0	
W	(link register)	1	
R	(file register)	2	
TN	(timer/current value)	3	
CN	(counter/current value)	4	
M	(internal relay)	6	
L	(latch relay)	7	
B	(link relay)	8	
X	(input relay)	9	
Y	(output relay)	10	
TS	(timer/contact)	11	
TC	(timer/coil)	12	
CS	(counter/contact)	13	
CC	(counter/coil)	14	

KZ/KV Series CPU, KZ24/300 CPU, KV10/24 CPU

Memory		TYPE	Remarks
DM	(data memory)	0	
CH	(input/output relay)	1	
TC	(timer/current value)	2	
CC	(counter/current value)	3	
TS	(timer/set value)	4	
CS	(counter/set value)	5	
T	(timer/contact)	6	
C	(counter/contact)	7	
TM	(temporary data memory)	8	

KV-700, KV-1000

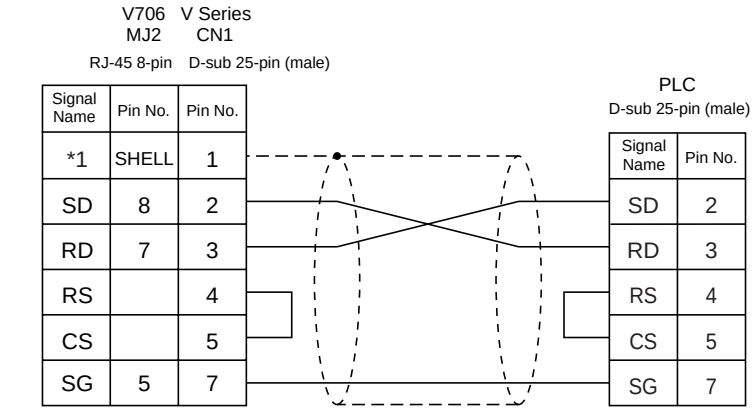
Memory		TYPE	Remarks
DM	(data memory)	0	
R	(input/output/internal auxiliary/special relay)	1	
TC	(timer/current value)	2	
CC	(counter/current value)	3	
TS	(timer/set value)	4	
CS	(counter/set value)	5	
T	(timer/contact)	6	
C	(counter/contact)	7	
TM	(temporary data memory)	8	
CTH	(high-speed counter/current value)	9	
CTC	(high-speed counter comparator/set value)	10	
CT	(high-speed counter comparator/contact)	11	
CR	(control relay)	12	
CM	(control memory)	13	
MR	(internal auxiliary relay)	14	KV-1000 only
LR	(latch relay)	15	KV-1000 only
EM	(extended data memory 1)	16	KV-1000 only
FM	(extended data memory 2)	17	KV-1000 only
Z	(index register)	18	KV-1000 only

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

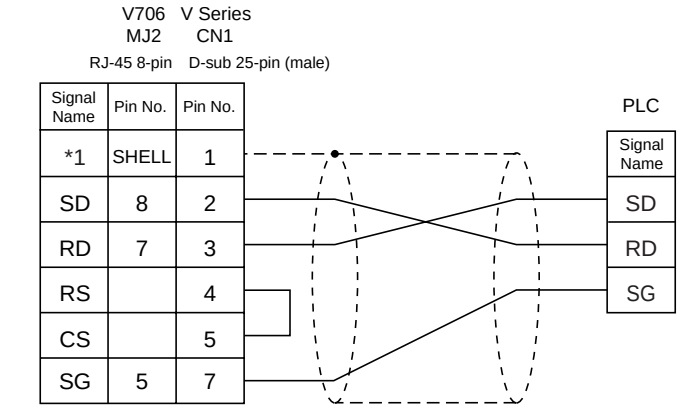
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

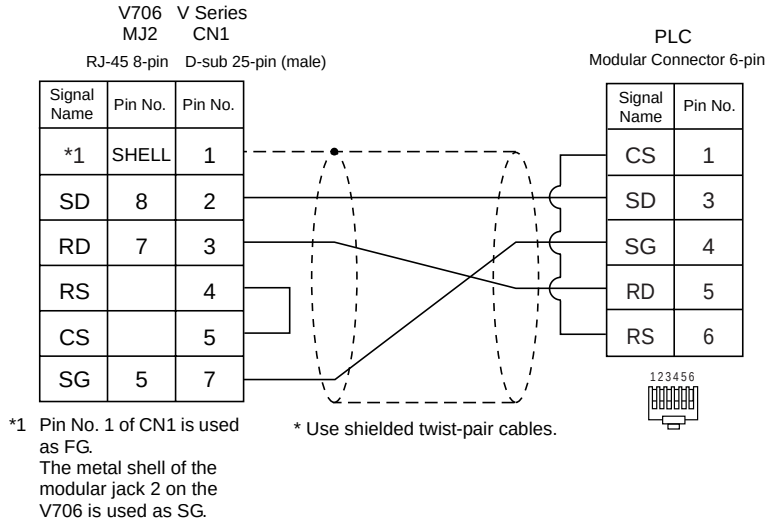
Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

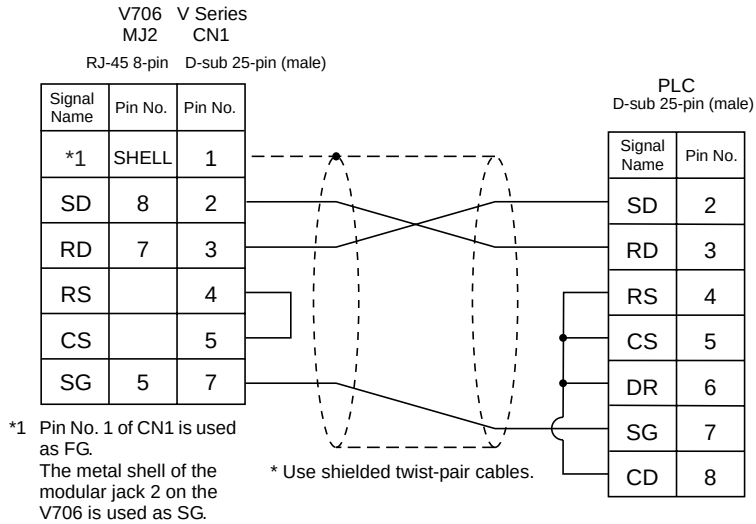
Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

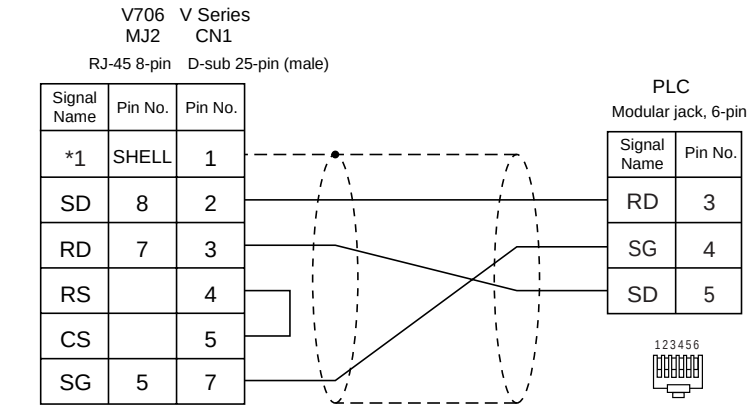
Wiring Diagram 4



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

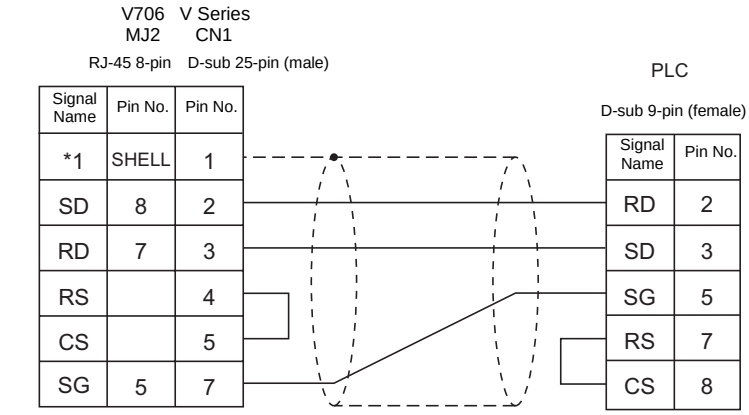
Wiring Diagram 5



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 6

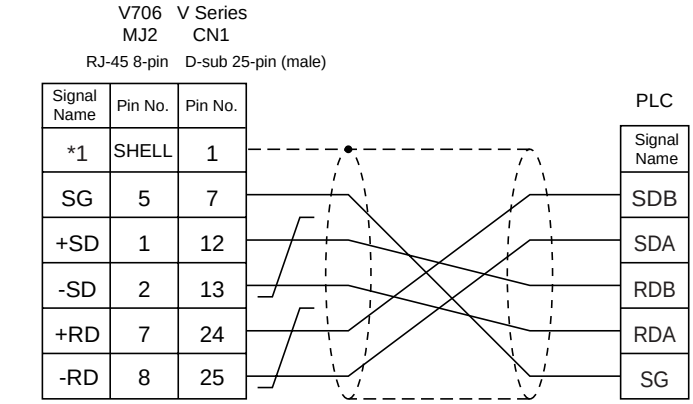


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-422

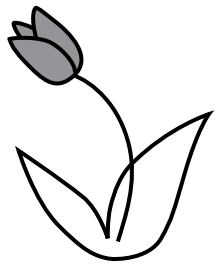
Wiring Diagram 7



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

MEMO



Please use this page freely.

13. KOYO ELECTRONICS PLC

Available PLCs

<table>
<tr><th>Select PLC Type</th><th>PLC</th><th>Unit/Port</th><th>Connection</th><th>PLC2Way</th><th>Ladder Transfer</th></tr>
<tr><td rowspan="11">SU/SG</td><td>SU-5/5E/6B/5M/6M</td><td>U01-DM</td><td>RS-232C[Wiring Diagram 1]
RS-422[Wiring Diagram 3]</td><td rowspan="20">×</td><td rowspan="20">×</td></tr>
<tr><td>SU-5E/6B</td><td rowspan="2">Universal port 1 on CPU</td><td>RS-232C[Wiring Diagram 1]
RS-422[Wiring Diagram 7]</td></tr>
<tr><td rowspan="3">SU-5M/6M</td><td>RS-485[Wiring Diagram 8]</td></tr>
<tr><td>Universal port 2 on CPU</td><td rowspan="2">RS-232C*1
KOYO's programmer connecting cableS-30JG-E
+
KOYO's conversion connector cableS-15CNJ</td></tr>
<tr><td>SZ-4</td><td>PORT2 on CPU
(universal communication port)</td></tr>
<tr><td>SZ-4M</td><td>PORT2 on CPU
(universal communication port)</td><td>RS-232C*1
KOYO's programmer connecting cableS-30JG-E
+
KOYO's conversion connector cableS-15CNJ
+
KOYO's conversion connectorS-15HCNP1</td></tr>
<tr><td rowspan="2">SG-8</td><td>G01-DM</td><td>RS-232C[Wiring Diagram 1]
RS-422[Wiring Diagram 4]</td></tr>
<tr><td>Port on CPU</td><td>RS-232C[Wiring Diagram 1]
RS-422[Wiring Diagram 4]</td></tr>
<tr><td>PZ3</td><td>Universal communication port on the CPU unit</td><td>RS-232C[Wiring Diagram 2]
RS-485[Wiring Diagram 6]</td></tr>
<tr><td rowspan="2">SR-T</td><td rowspan="2">SR-6T
(Toyota version)</td><td>U01-DM</td><td>RS-232C[Wiring Diagram 1]
RS-422[Wiring Diagram 3]</td></tr>
<tr><td>G01-DM</td><td>RS-232C[Wiring Diagram 1]
RS-422[Wiring Diagram 4]</td></tr>
<tr><td>SR-T (K Protocol)</td><td>SR-1T
(Toyota version)</td><td>Terminal block on the CPU unit</td><td>RS-422[Wiring Diagram 5]</td></tr>
<tr><td rowspan="9">SU/SG
(K-Sequence)</td><td>SU-5E/6B</td><td rowspan="2">Universal port 1 on CPU</td><td>RS-232C[Wiring Diagram 1]
RS-485[Wiring Diagram 7]</td></tr>
<tr><td rowspan="3">SU-5M/6M</td><td rowspan="2">Programmer port on CPU</td><td>RS-232C*1
KOYO's programmer connecting cableS-30JG-E</td></tr>
<tr><td>Universal port 3 on CPU</td><td>RS-485[Wiring Diagram 8]</td></tr>
<tr><td>Universal port 2 on CPU</td><td rowspan="3">RS-232C*1
KOYO's programmer connecting cableS-30JG-E
+
KOYO's conversion connector cableS-15CNJ</td></tr>
<tr><td rowspan="2">SZ-4</td><td>PORT1 on CPU (programmer port)</td></tr>
<tr><td>PORT2 on CPU
(universal communication port)</td></tr>
<tr><td rowspan="2">SZ-4M</td><td>PORT1 on CPU (programmer port)</td></tr>
<tr><td>PORT2 on CPU
(universal communication port)</td><td>RS-232C*1
KOYO's programmer connecting cableS-30JG-E
+
KOYO's conversion connector cableS-15CNJ
+
KOYO's conversion connectorS-15HCNP1</td></tr>
</table>

*1 When connecting to MJ2 on the V706, use an MJ2-PLC adaptor plus the designated cables.

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		[0] × 10, [1] × 1	1
Parity		Odd	Odd
Transmission code	Data length	8	8
	Stop bit	1	1
Functions		Host link function (fixed)	–
Response delay time		0 (fixed)	–
Timeout		None (fixed)	–
ASCII/HEX		HEX (fixed)	–

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

SU/SG, SU/SG (K-Sequence)

Memory		TYPE	Remarks
R	(data register)	0	
I	(input relay)	1	
Q	(output relay)	2	
M	(internal relay)	3	
S	(stage)	4	
GI	(global input)	5	
GQ	(global output)	6	
T	(timer/contact)	7	
C	(counter/contact)	8	

SR-T/SR-T (K Protocol)

Memory		TYPE	Remarks
D	(data register)	0	
X	(input relay)	1	Common to X/Y
Y	(output relay)	2	Common to X/Y
M	(internal relay)	3	
S	(stage)	4	
K	(keep relay)	5	
L	(link relay)	6	
T	(timer/contact)	7	
C	(counter/contact)	8	

Switch Setting

U-01DM

On-line/Off-line switch: On-line
UNIT ADR switch: “0” for ×10, “1” for ×1
SW4 DIP switch:

No	Setting	Contents
1	ON	Same as that set on V7 Normally 19200 bps
2	ON	
3	ON	
4	ON	With parity
5	OFF	Self-diagnosis
6	OFF	Response delay time 0 msec
7	OFF	
8	OFF	

SW5 DIP switch:

No	Setting	Contents
1	OFF	Master/slave control
2	OFF	Slave
3	OFF	Communication timeout
4	OFF	HEX mode

G-01DM

On-line/Off-line switch: On-line
Short plug 1: open
Short plug 2: RS-232C . . . . . ENABLE
RS-422 . . . . . DISENABLE

SW1 DIP switch:

No	Setting	Contents
1	ON	Unit No. 1
2	OFF	
3	OFF	
4	OFF	
5	OFF	
6	OFF	
7	OFF	
8	OFF	1 : N
9	OFF	Slave

SW2 DIP switch:

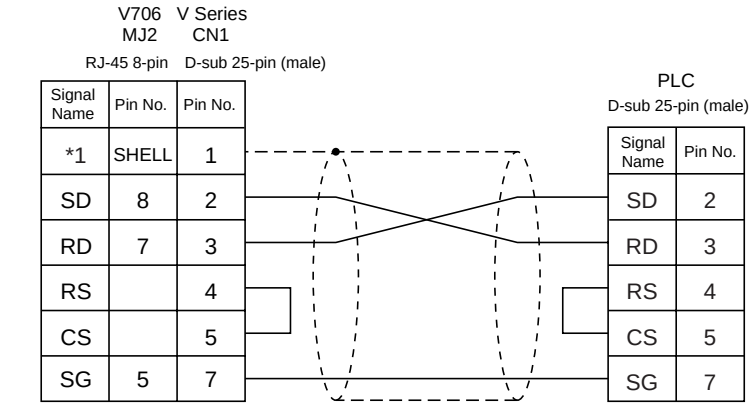
No	Setting	Contents
1	ON	Same as that set on V7 Normally 19200 bps
2	ON	
3	ON	
4	ON	With parity
5	OFF	Self-diagnosis
6	OFF	Turn-around delay
7	OFF	Response delay time 0 msec
8	OFF	
9	OFF	HEX mode

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

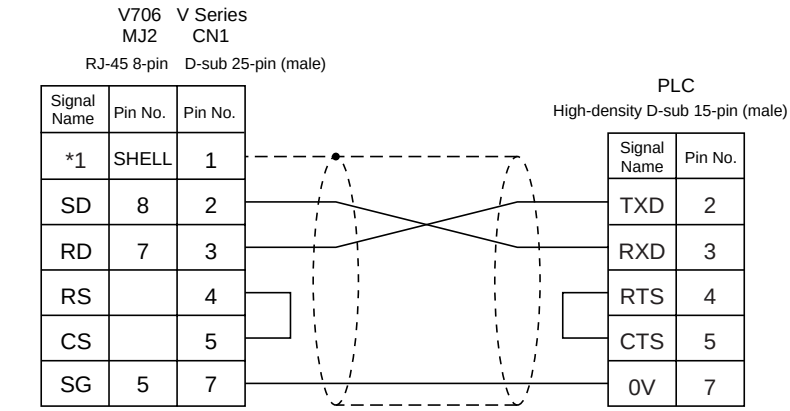
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 2

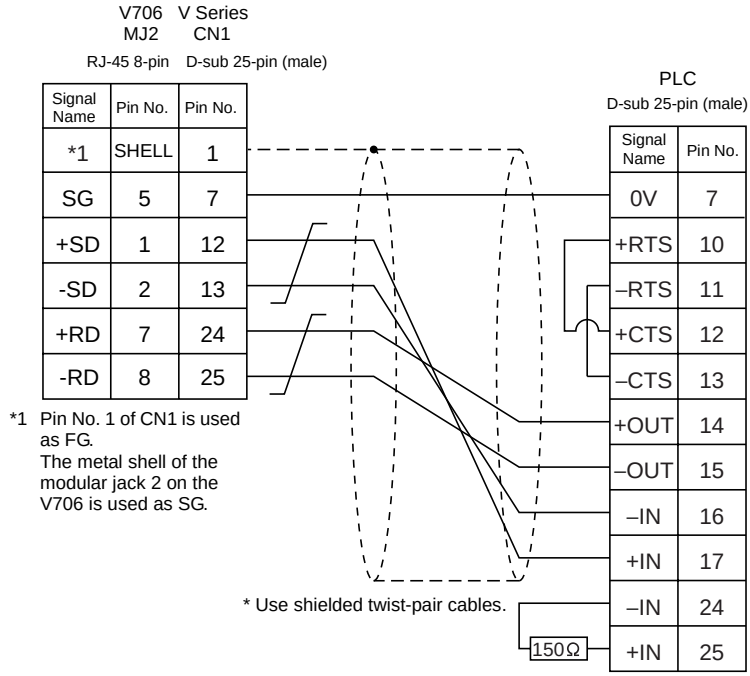


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

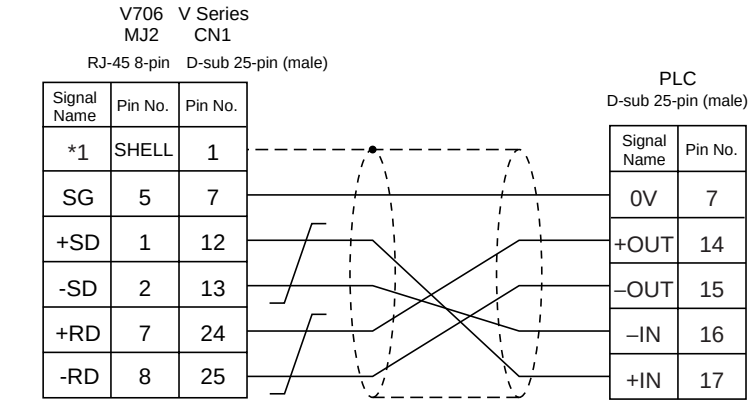
RS-422

Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

Wiring Diagram 4



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 5

V706 MJ2 RJ-45 8-pin — V Series CN1 D-sub 25-pin (male)

Signal Name	Pin No.	Pin No.
*1	SHELL	1
SG	5	7
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25

PLC

Signal Name
FG
T1
T2
T3

*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 6

V706 MJ2 RJ-45 8-pin — V Series CN1 D-sub 25-pin (male)

Signal Name	Pin No.	Pin No.
*1	SHELL	1
SG	5	7
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25

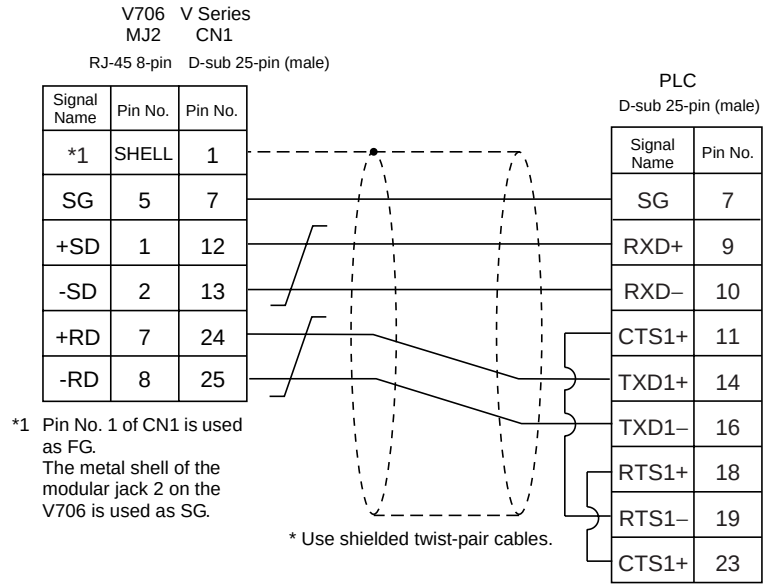
PLC
High-density D-sub 15-pin (male)

Signal Name	Pin No.
RXD–	6
0V	7
TXD+	9
TXD–	10
RTS+	11
RTS–	12
RXD+	13
CTS+	14
CTS–	15

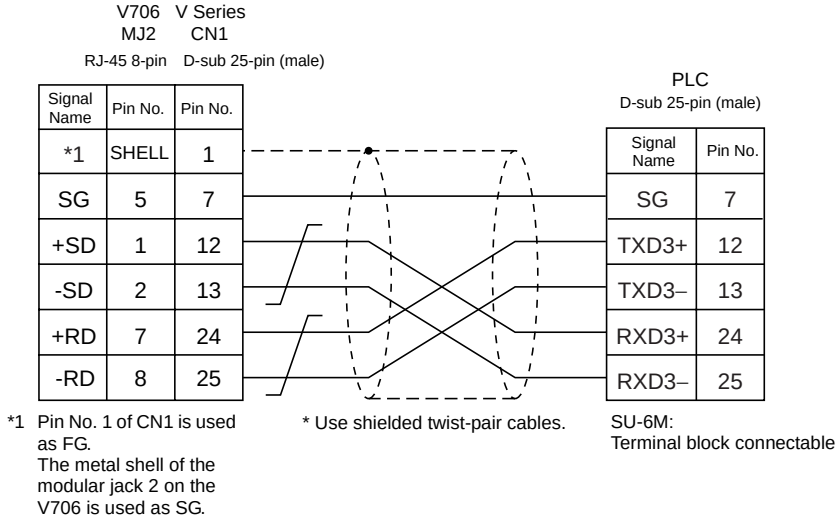
*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 7



Wiring Diagram 8



14. LS PLC

Available PLCs

Select PLC Type	PLC		Connection		PLC2Way	Ladder Transfer
MASTER-K10/60/200	K10/60/200		RS-232C	[Wiring Diagram 1]	×	×
MASTER-K500/1000	K500/1000		RS-232C RS-422	[Wiring Diagram 2] [Wiring Diagram 6]		
MASTER-KxxxS	K200S/K300S/K1000S CPU port		RS-232C	[Wiring Diagram 3]		
MASTER-KxxxS CNET	K4F-CUEA		RS-232C RS-422	[Wiring Diagram 4] [Wiring Diagram 7]		
GLOFA CNET	G4L-CUEA					
GLOFA GM series CPU	GM4/GM6/GM7 CPU port		RS-232C	[Wiring Diagram 5]		
XGT/XGK series	XGK-CPUH XGK-CPUS	XGL-CH2A XGL-C22A XGL-C42A	RS-232C RS-422	[Wiring Diagram 3] [Wiring Diagram 8]		

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

MASTER-K10/60/200

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps (fixed)	–
Parity		None (fixed)	–
Transmission code	Data length	8 (fixed)	–
	Stop bit	1 (fixed)	–

MASTER-K500/1000

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps*1	19200 bps
Parity		None (fixed)	–
Transmission code	Data length	8 (fixed)	–
	Stop bit	1 (fixed)	–

*1 For signal level RS-422, baud rate is fixed to 9600 bps.

MASTER-KxxxS

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		38400 bps	38400 bps
Parity		None (fixed)	–
Transmission code	Data length	8 (fixed)	–
	Stop bit	1 (fixed)	–

MASTER-KxxxS CNET / GLOFA CNET / GM Series CPU

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		38400 bps	38400 bps
Parity		Not provided	Not provided
Transmission code	Data length	8	8
	Stop bit	1	1

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

MASTER-K10/60/200

Memory		TYPE	Remarks
D	(data register)	0	
M	(auxiliary relay)	1	
P	(input/output relay)	2	Input: Read only
K	(keep relay)	3	
TC	(timer/current value)	4	
CC	(counter/current value)	5	
TS	(timer/set value)	6	
CS	(counter/set value)	7	

MASTER-K500/1000

Memory		TYPE	Remarks
P	(input/output relay)	0	Input: Read only
M	(relay)	1	
L	(link relay)	2	
K	(keep relay)	3	
F	(special relay)	4	Read only
T	(timer/current value)	5	
C	(counter/set value)	6	
D	(data register)	7	

MASTER-KxxxS

Memory		TYPE	Remarks
P	(input/output relay)	0	Input: Read only
M	(auxiliary relay)	1	
L	(link relay)	2	
K	(keep relay)	3	
F	(special relay)	4	Read only
T	(timer/current value)	5	
C	(counter/set value)	6	
D	(data register)	7	
TC	(timer/contact)	9	
CC	(counter/contact)	10	

MASTER-KxxxS CNET

Memory		TYPE	Remarks
P	(input/output relay)	0	PW as word device, input: read only
M	(auxiliary relay)	1	MW as word device
L	(link relay)	2	LW as word device
K	(keep relay)	3	KW as word device
F	(special relay)	4	FW as word device, read only
T	(timer/current value)	5	
C	(counter/setting value)	6	
D	(data register)	7	
TC	(timer/contact)	9	
CC	(counter/contact)	10	

GLOFA CNET / GM Series CPU

Memory		TYPE	Remarks
M	(internal memory)	0	MW as word device
Q	(output)	1	QW as word device
I	(input)	2	IW as word device

XGT / XGK Series

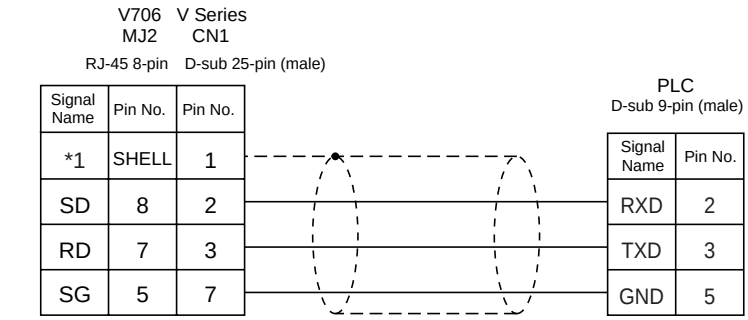
Memory		TYPE	Remarks
P	(input/output relay)	0	PW as word device, input: read only
M	(auxiliary relay)	1	MW as word device
L	(link relay)	2	LW as word device
K	(keep relay)	3	KW as word device
F	(special relay)	4	FW as word device, read only
T	(timer/current value)	5	
C	(counter/setting value)	6	
D	(data register)	7	
TC	(timer/contact)	9	
CC	(counter/contact)	10	
N	(communication data register)	11	
R	(file register)	12	RW as word device
ZR	(file register)	13	
U	(analog data register)	14	UW as word device

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

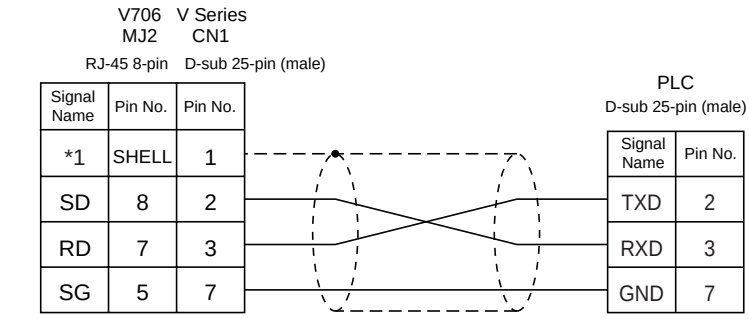
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

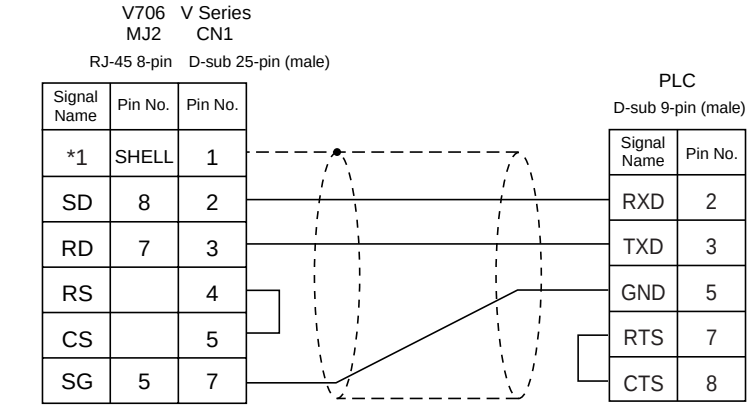
Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

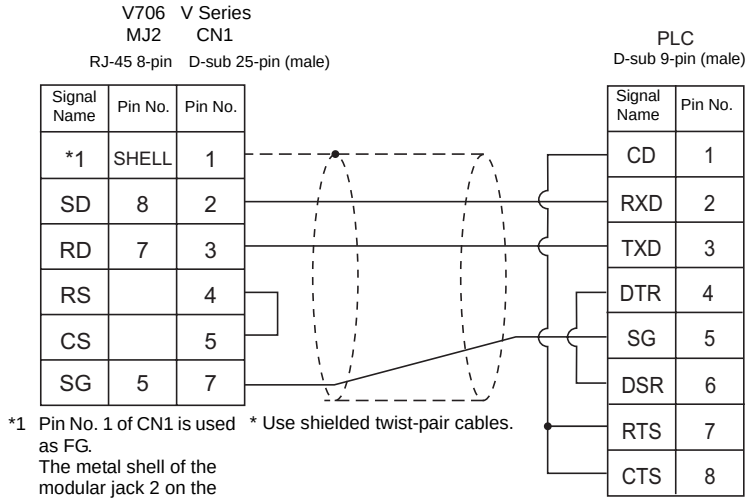
Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

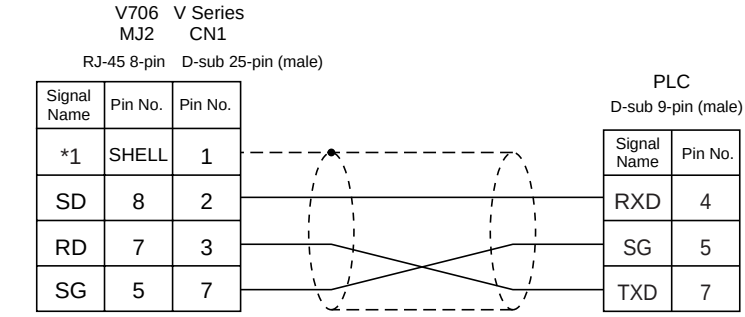
Wiring Diagram 4



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 5

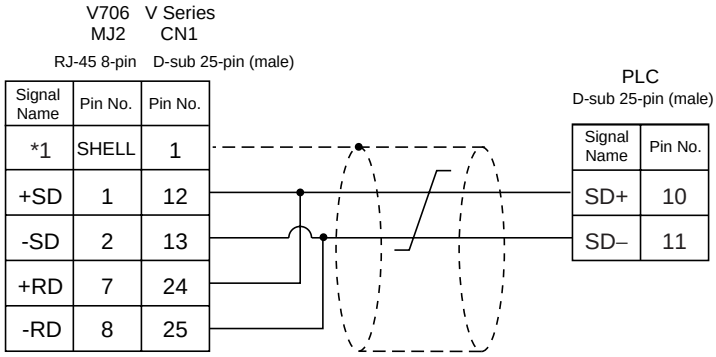


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-422

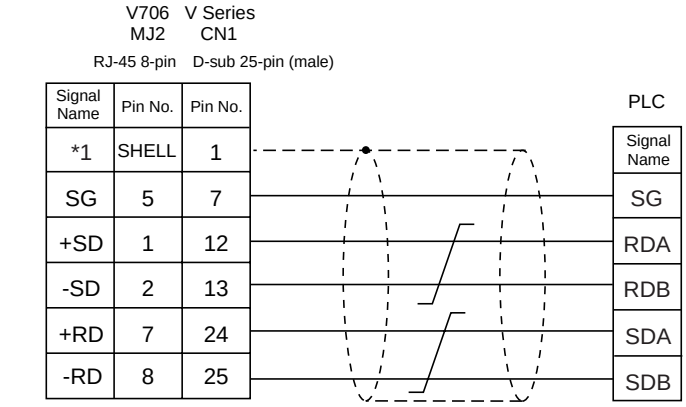
Wiring Diagram 6



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

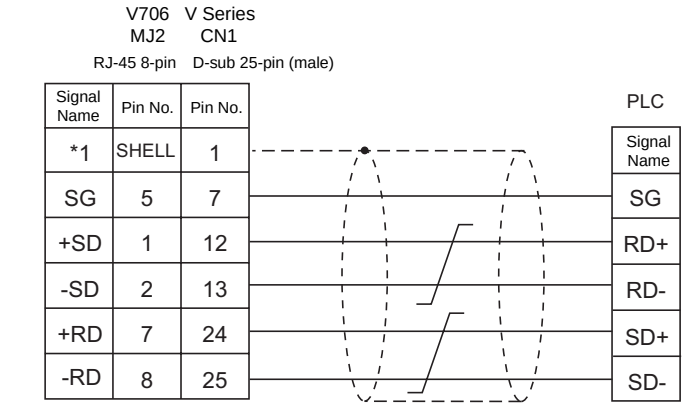
Wiring Diagram 7



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 8



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

15. Matsushita Electric Works PLC

Available PLCs

Select PLC Type	PLC	Unit/Port		Connection	PLC2Way	Ladder Transfer*2
MEWNET	FP1	RS-232C port on the CPU unit		RS-232C [Wiring Diagram 1]	○	×
	FP3	AFP3462 (communication unit)		RS-232C [Wiring Diagram 1]		
		AFP3463 (C-NET link unit)		RS-422 [Wiring Diagram 6]		
	FP5	AFP5462 (communication unit)		RS-232C [Wiring Diagram 1]		
	FP10	RS-232C port on the CPU unit		RS-232C [Wiring Diagram 1]		
		AFP5462 (communication unit)		RS-232C [Wiring Diagram 1]		
	FP10S	RS-232C port on the CPU unit		RS-232C [Wiring Diagram 1]		
		AFP3462 (communication unit)		RS-232C [Wiring Diagram 1]		
		AFP3463 (C-NET link unit)		RS-422 [Wiring Diagram 6]		
	FP0	RS-232C tool port on the CPU unit		Matsushita's RS-232C cable "AFC8513"*1		○
		RS-232C port on the CPU unit		RS-232C [Wiring Diagram 3]		×
	FP2	RS-232C tool port on the CPU unit		Matsushita's RS-232C cable "AFC8513"*1		○
		RS-232C port on the CPU unit		RS-232C [Wiring Diagram 2]		×
	FPΣ	RS-232C tool port on the CPU unit		Matsushita's RS-232C cable "AFC8513"*1		○
		AFPG801	COM1	RS-232C [Wiring Diagram 4]		×
		AFPG802	COM1, 2	RS-232C [Wiring Diagram 5]		
		AFPG803	COM1	RS-485 [Wiring Diagram 7]		
		AFPG806	COM2	RS-232C [Wiring Diagram 3]		
			COM1	RS-485 [Wiring Diagram 6]		
	FP-e	RS-232C tool port on the CPU unit		Matsushita's RS-232C cable "AFC8513"*1		○
		COM port		RS-232C [Wiring Diagram 3]		×
				RS-485 [Wiring Diagram 7]		
	FP-X	RS-232C tool port on the CPU unit		Matsushita's RS-232C cable "AFC8513"*1		○
		AFPX-COM1	COM1	RS-232C [Wiring Diagram 4]		×
		AFPX-COM2	COM1, 2	RS-232C [Wiring Diagram 5]		
		AFPX-COM3	COM1	RS-485 [Wiring Diagram 6]		
		AFPX-COM4	COM2	RS-232C [Wiring Diagram 3]		
			COM1	RS-485 [Wiring Diagram 6]		

*1 For connection to MJ2 of a V706, use an MJ2-PLC adaptor plus AFC8513.
*2 For the ladder transfer function, refer to "Appendix 8 Ladder Transfer Function."

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		[0] × 10, [1] × 1	1
Parity		Even	Even
Transmission code	Data bit	7 (ASCII)	7
	Stop bit	1	1
Transmission mode		Computer link function (fixed)	–
Control signal		Invalid (fixed)	–

* If a tool port (the ladder port for RS-232C) is used, the range of PLC (except for FPΣ, FP-X) parameter setting is limited as below. Adjust the PLC parameter setting to communication parameter setting of the V7 series.

- Baud rate: 9600, 19200 bps (maximum 115 kbps available with FP2)
- Parity: Odd (fixed)
- Data bit: 8 (or 7)
- Stop bit: 1 (fixed)

DIP Switch Setting

AFP3462, AFP5462 (Communication Unit)

Switch	Setting	Contents
1	ON	Same as that set on V7 (normally 19200 bps)
2	OFF	
3	OFF	
4	OFF	Data length: 7 bits
5	ON	With parity
6	ON	Even
7	OFF	Stop bit 1
8	OFF	CS, CD invalid

AFP3463 (C-NET Link Unit)

Switch	Setting	Contents
1	OFF	Same as that set on V7 (normally 19200 bps)
2	OFF	Data length: 7 bits
3	ON	With parity
4	ON	Even
5	OFF	Stop bit 1
6	OFF	-
7	OFF	-
8	OFF	-

FP10, FP10S (RS-232C on the CPU Unit)

Switch	Setting	Contents
4	OFF	Same as that set on V7 (normally 19200 bps)
5	OFF	Data length: 7 bits
6	ON	With parity
7	ON	Even
8	OFF	Stop bit 1

AFPX-COM3 (Communication Cassette)

Switch	Setting	Contents
1	ON	RS-485
2	ON	
3	ON	
4	ON	Terminating resistance

System Register Setting

Tool Port

FP0/FP2/FP-e

System Register *1	Contents	
411	Data length	7 bits
414	Baud rate	19200 *2

*1 For FP0, system register setting is enabled in the RUN mode.
*2 For FP2, baud rate setting is enabled when DIP switch 1 is off on the back of the CPU unit.

FPΣ

System Register *1	Contents	
413	Data length	7 bits
	Parity	Even
	Stop bit	1
414	Baud rate	19200

*1 System register setting is enabled in the RUN mode.

FP-X

System Register *1	Contents	
410	Unit No.	1
412	Communication mode	Computer link
413	Data length	7 bits
	Parity	Even
	Stop bit	1
415	Baud rate	19200

*1 System register setting is enabled in the RUN mode.

COM Port

FP1/FP0/FP2/FP-e

System Register *1	Contents	
412	Transfer selection	Computer link
413	Data length	7 bits
	Parity	Even
	Stop bit	1
	End code*2	CR
	Start code*2	without STX
414	Baud rate	19200

*1 For FP1/FP0, system register setting is enabled in the RUN mode.
*2 For FP2/FP-e, end and start code settings are disabled.

FPΣ/FP-X

System Register *1		Contents	
COM1	COM2		
410	411	Unit No.	1 *3
412		Transfer selection	Computer link
413	414	Data length	7 bits
		Parity	Even
		Stop bit	1
415		Baud rate	19200 *2

*1 System register setting is enabled in the RUN mode.
*2 For AFPG806 COM1, DIP switch setting is also required.
SW1-2 OFF: 19200 bps, ON: 115 kbps
*3 In addition to system register setting, unit number setting is also possible with the port setting switch. For more information, refer to the corresponding PLC manual.

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

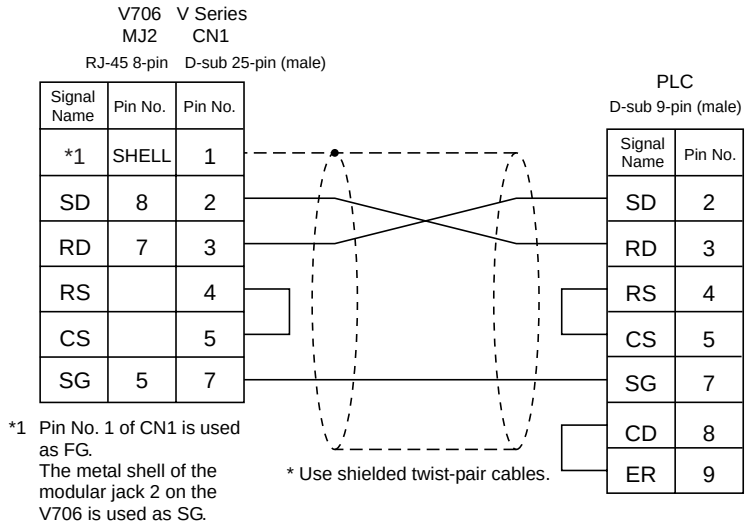
Memory		TYPE	Remarks
DT	(data register)	0	
X	(external input relay)	1	WX as word device, read only
Y	(external output relay)	2	WY as word device
R	(internal relay)	3	WR as word device, including special relays
L	(link relay)	4	WL as word device
LD	(link register)	5	
FL	(file register)	6	FP2, 3, 5, 10 only
SV	(timer/counter set value)	7	
EV	(timer/counter elapsed time)	8	
T	(timer/contact)	9	Read only
C	(counter/contact)	10	Read only

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

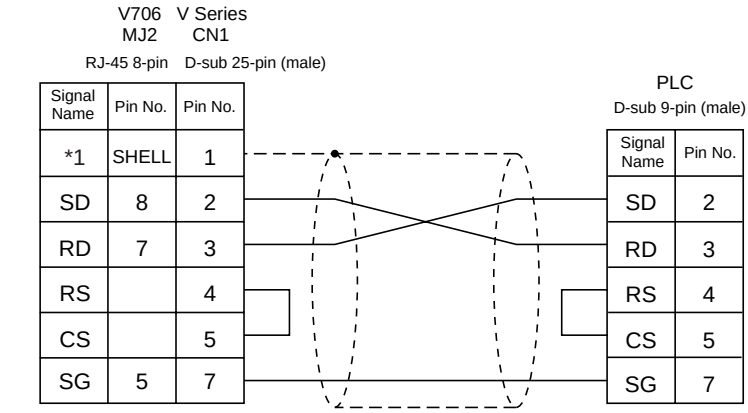
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 3

V706 MJ2 (RJ-45 8-pin) — V Series CN1 (D-sub 25-pin (male))

Signal Name	Pin No.	Pin No.
*1	SHELL	1
SD	8	2
RD	7	3
RS		4
CS		5
SG	5	7

PLC

Signal Name
SD
RD
SG

*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 4

V706 MJ2 (RJ-45 8-pin) — V Series CN1 (D-sub 25-pin (male))

Signal Name	Pin No.	Pin No.
*1	SHELL	1
SD	8	2
RD	7	3
RS		4
CS		5
SG	5	7

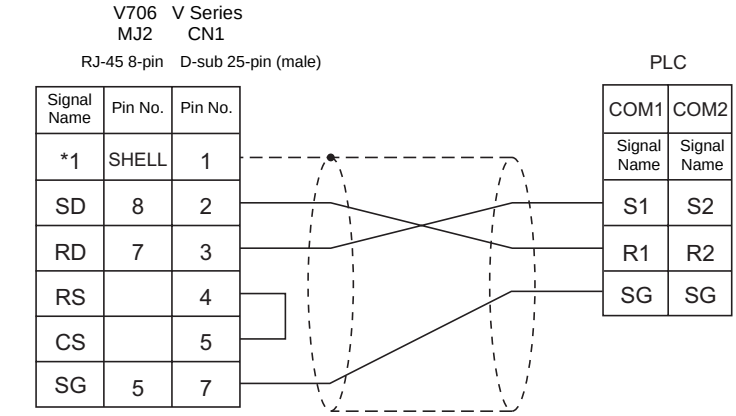
PLC

Signal Name
SD
RD
RS
CS
SG

*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 5

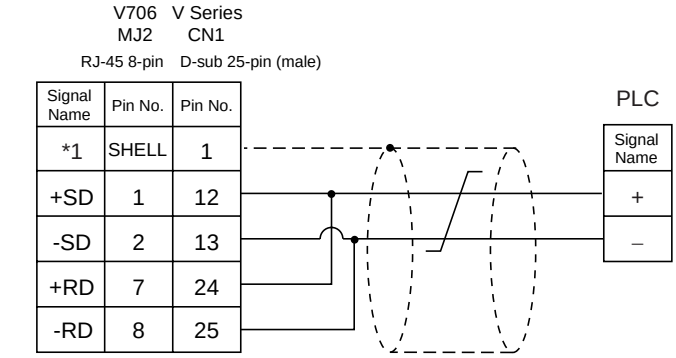


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-422

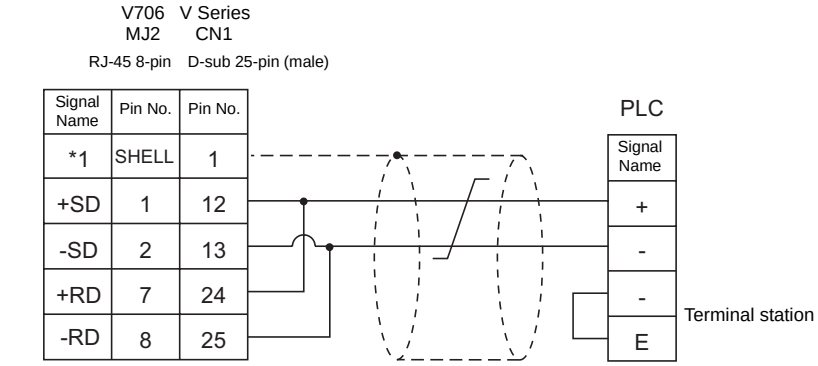
Wiring Diagram 6



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 7



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

16. MITSUBISHI ELECTRIC PLC

Available PLCs

A Series Link, QnA Series Link, QnH (Q) Series Link, A Link + Net10*1

Select PLC Type	CPU	Unit/Port	Connection	PLC2Way	Ladder Transfer*4
A series link	A2A, A3A	AJ71C24-S6 AJ71C24-S8 AJ71UC24	RS-232C [Wiring Diagram 2]	○	×
	A2U, A3U, A4U	AJ71UC24			
	A1, A2, A3 A1N, A2N, A3N A3H, A3M, A73	AJ71C24 AJ71C24-S3 AJ71C24-S6 AJ71C24-S8 AJ71UC24	RS-422 [Wiring Diagram 5]	○	
	A0J2, A0J2H	A0J2C214-S1			
	A2US	A1SJ71UC24-R2	RS-232C [Wiring Diagram 1]	○	
		A1SJ71UC24-R4	RS-422 [Wiring Diagram 5]	○	
		A1SJ71UC24-PRF	RS-232C [Wiring Diagram 1]	○	
	A1S, A1SJ, A2S	A1SJ71C24-R2	RS-232C [Wiring Diagram 1]	○	
		A1SJ71C24-R4	RS-422 [Wiring Diagram 5]	○	
		A1SJ71C24-PRF	RS-232C [Wiring Diagram 1]	○	
	A2CCPUC24	CPU built-in link port	RS-232C [Wiring Diagram 1]	○	
	QnH (A mode)	A1SJ71UC24-R2	RS-232C [Wiring Diagram 1]	○	
		A1SJ71UC24-R4	RS-422 [Wiring Diagram 5]	○	
QnA series link	Q2A, Q3A, Q4A Q2ASx	AJ71QC24N	RS-232C [Wiring Diagram 2]	○	
			RS-422 [Wiring Diagram 5]	×	
		AJ71QC24	RS-232C [Wiring Diagram 2]	○	
			RS-422 [Wiring Diagram 5]	×	
		A1SJ71QC24	RS-232C [Wiring Diagram 1]	○	
			RS-422 [Wiring Diagram 5]	×	
		AJ71QC24-R4(CH1)	RS-422 [Wiring Diagram 6]	×	
		AJ71QC24-R4(CH2)	RS-422 [Wiring Diagram 5]	×	
QnH (Q) series link (Multi CPU)	Q02, Q02H, Q06H, Q12H, Q25H	QJ71C24 QJ71C24N QJ71C24-R2 QJ71C24N-R2 QJ71C24N-R4	RS-232C [Wiring Diagram 1]	○	
QnH (Q) series link	QnH (Q mode)				
	Q00, Q01, Q00J		RS-422 [Wiring Diagram 5]	×	
	Q00, Q01	Tool port*2	RS-232C Hakko Electronics' cable "QCPU2"*3	○	○
A link + Net10	Standard type link +unit for A series link*1			×	×

*1 For more information on A link + Net10, refer to page 16-14.
*2 For notes on the connection between the tool port of a Q00/Q01 CPU and the V7 series using the serial communication function, refer to page 16-4.
For the description of the ladder transfer function, refer to "Appendix 8 Ladder Transfer Function".
*3 For connection to MJ2 of a V706, use an MJ2-PLC adaptor plus QCPU2.
*4 For the ladder transfer function, refer to "Appendix 8 Ladder Transfer Function."

A Series CPU, QnA Series CPU, QnH Series CPU, Q00J/00/01 CPU

Select PLC Type	CPU	Unit/Port	Connection	PLC2Way	Ladder Transfer*2
A series CPU	A2A, A3A A2U, A3U, A4U A2US(H) A1N, A2N, A3N A3V, A73 A3H, A3M A0J2H A1S(H), A1SJ(H), A2S(H) A2CCPUC24 A1FX	Tool port*1	RS-422 Hakko Electronics' cable "MB-CPUQ" or [Wiring Diagram 7]	×	○
QnA series CPU	Q2A, Q3A, Q4A Q2AS(H)				×
QnH (A) series CPU	Q06H-A	Tool port	RS-232C Hakko Electronics' cable "QCPU2"*3	×	×
QnH (Q) series CPU	Q02, Q02H Q06H Q12H Q25H	Tool port		○	○
QnH (Q) series CPU (Multi CPU)		Tool port*4		×	
Q00J/00/01 CPU	Q00J Q00 Q01	Tool port		×	

*1 For more information of V-MDD (dual port interface), refer to page 16-16.
*2 For the ladder transfer function, refer to "Appendix 8 Ladder Transfer Function".
*3 For connection to MJ2 of a V706, use an MJ2-PLC adaptor plus QCPU2.
*4 It is available with Function version "B" or later.

FX Series

Select PLC Type	CPU	Unit/Port	Connection	PLC2Way	Ladder Transfer*3
FX series CPU	FX1/2	Tool port*1	RS-232C Hakko Electronics' cable "PC-CX24A" RS-422 Hakko Electronics' cable "MB-CPUQ" or [Wiring Diagram 7]	×	○
	FX0N	Tool port*1	RS-422 Hakko Electronics' cable "MI4-FX"*2 or Hakko Electronics' cable "MB-CPUQ" + MITSUBISHI's conversion cable "FX-20P-CADP"	×	
FX2N series CPU	FX2N/1N				
	FX2NC				
FX1S series CPU	FX1S				

Select PLC Type	CPU	Unit/Port	Connection	PLC2Way	Ladder Transfer*3
FX series link (A Protocol)	FX2N	FX2N-232-BD	RS-232C [Wiring Diagram 3]	○	×
		FX2N-485-BD	RS-485 [Wiring Diagram 8]	○	
		FX2N-422-BD	RS-422 Hakko Electronics' cable "MI4-FX"*2	×	
	FX1N FX1S	FX1N-232-BD	RS-232C [Wiring Diagram 3]	○	
		FX1N-485-BD	RS-485 [Wiring Diagram 8]	○	
		FX1N-422-BD	RS-422 Hakko Electronics' cable "MI4-FX"*2	×	
	FX0N	FX0N-232ADP	RS-232C [Wiring Diagram 4]	○	
		FX0N-485ADP	RS-485 [Wiring Diagram 8]	○	
	FX2NC	FX0N-232ADP	RS-232C [Wiring Diagram 4]	○	
		FX0N-485ADP	RS-485 [Wiring Diagram 8]	○	
FX-3UC Series CPU	FX-3UC	Tool port*1	RS-422 Hakko Electronics' cable "MI4-FX"*2 or Hakko Electronics' cable "MB-CPUQ" + MITSUBISHI's conversion cable "FX-20P-CADP"	×	○

*1 For more information of V-MDD (dual port interface), refer to page 16-16.
*2 For connection to MJ2 of a V706, use an MJ2-MI4FX.
*3 For the ladder transfer function, refer to "Appendix 8 Ladder Transfer Function."

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

A Series Link

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		0 for both stations ×10, ×1	0
Parity		Even	Even
Transmission mode	RS-232C	MODE1(without CR/LF)	Trans. Mode 1
		MODE4(with CR/LF)	Trans. Mode 4
	RS-422	MODE5(without CR/LF)	Trans. Mode 1
		MODE8(with CR/LF)	Trans. Mode 4
Transmission code	Data length	7	7
	Stop bit	1	1
Sumcheck		Provided (fixed)	–
Write while running		Possible (fixed)	–
Terminating resistance at sender		Provided (fixed)	–
Terminating resistance at receiver		Provided (fixed)	–

QnA Series Link, QnH (Q) Series Link, QnH (Q) Series Link (Multi CPU)

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate*		19200 bps	19200 bps
Port		0 for both stations ×10, ×1	0
Parity		Even	Even
Transmission mode	RS-232C	QnA series link: MODE5 (binary mode) (fixed) QnH (Q) series link: MC protocol 5 (fixed)	–
	RS-422		
Transmission code	Data length	8 (fixed)	–
	Stop bit	1	1
Sumcheck		Provided (fixed)	–
Write while running		Possible (fixed)	–

* The maximum baud rate available with the V7 series is 115200 bps.
Select the appropriate baud rate depending on the used PLC and environment.

Connection to Q00/Q01 CPU

When connecting the tool port of a Q00/Q01 CPU and the V7 series using the PLC serial communication function, the following setting is required.

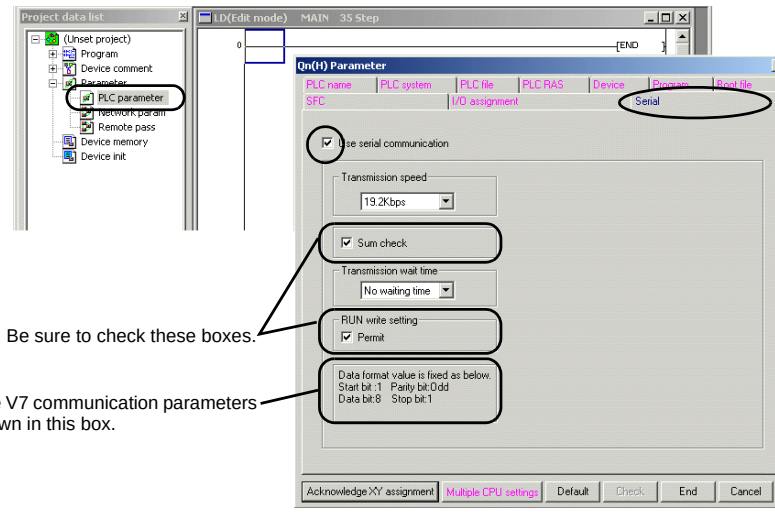
* It is possible to select [Q00J/00/01] CPU with V-SFT Ver. 2.2.37.0 or later.

V-SFT Setting

Select [QnH(Q) series link] in the [Select PLC Type] dialog.

GX Developer (MITSUBISHI programming software)

1. Double-click [PLC Parameter].
2. In the [Qn(H) Parameter] dialog, click the [Serial] tab.
3. Check [Use serial communication]. Set the options such as a baud rate.



A Series CPU, QnA Series CPU

Communication parameters for the V7 series are automatically set.

QnH (A) Series CPU, QnH (Q) Series CPU, QnH (Q) Series CPU (Multi CPU), Q00J/00/01 CPU

Communication parameters for the V7 series except the baud rate are automatically set.

* The maximum baud rate available with the V7 series is 115200 bps.
  Select the appropriate baud rate depending on the used PLC and environment.

FX Series CPU, FX2N Series CPU, FX1S Series CPU, FX-3UC Series CPU

Communication parameters for the V7 series are automatically set.

FX Series Link (A Protocol)

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Parity		Even	Even
Transmission code	Data length	7	7
	Stop bit	1	1
Protocol		Dedicated protocol (fixed)	–
H/W type*1		Normal/RS-232C	RS-232C
Sumcheck		Added (fixed)	–
Transmission mode		Mode 1	Trans. Mode 1

*1 Select RS-485 when the link unit FX2N-485-BD, FX2N-422-BD, FX1N-485-BD, FX1N-422-BD or FX0N-485-ADP is used.

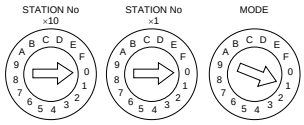
* We recommend to set 2 ms or above for [Send Delay Time] in the [Detail] tab window of the [Comm. Parameter] dialog of the V7 series.

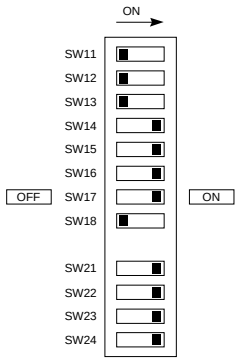
A Series Link, QnA Series Link: Switch Setting

The following is an example that shows the settings for both rotary DIP switches and DIP switches on the PLC.

AJ71UC24

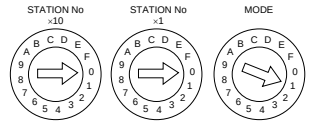
Example 1 Signal level: RS-232C, baud rate: 19200 bps, transmission mode 1

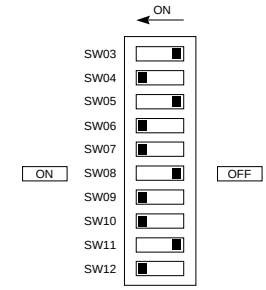




A1SJ71C24-R2, A1SJ71UC24-R2

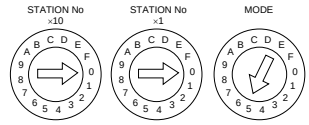
Example 2 Signal level: RS-232C, baud rate: 19200 bps, transmission mode 1

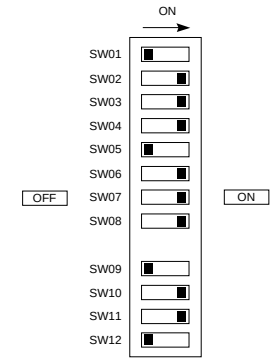




AJ71QC24, A1SJ71QC24, AJ71QC24N

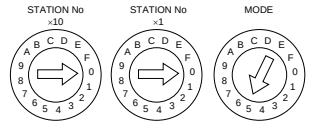
Example 3 Baud rate: 19200 bps

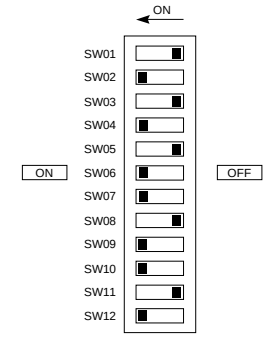




A1SJ71UC24-R4, A1SJ71C24-R4

Example 4 Signal level: RS-422, baud rate: 19200 bps, transmission mode 1





Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

A Series Link, QnA Series Link, QnH (Q) Series Link, QnH (Q) Series Link (Multi CPU), A Series CPU, QnA Series CPU, QnH (A) Series CPU, QnH (Q) Series CPU, Q00J/00/01 CPU, QnH (Q) Series CPU (Multi CPU), A Link + Net10

Memory		TYPE	Remarks
D	(data register)	0	
W	(link register)	1	
R	(file register)	2	*1
TN	(timer/current value)	3	
CN	(counter/current value)	4	
SPU	(special unit buffer memory)	5	*2
M	(internal relay)	6	
L	(latch relay)	7	
B	(link relay)	8	
X	(input relay)	9	
Y	(output relay)	10	
TS	(timer/contact)	11	
TC	(timer/coil)	12	
CS	(counter/contact)	13	
CC	(counter/coil)	14	
H	(link unit buffer memory)	15	
SD	(special register)	16	QnA, QnH (Q) series only (both link unit and CPU)
SM	(special relay)	17	QnA, QnH (Q) series only (both link unit and CPU)
SB	(special relay)	18	QnA, QnH (Q) series only (both link unit and CPU)
SW	(special link register)	19	QnA, QnH (Q) series only (both link unit and CPU)
ZR	(file register (for continuous access))	20	QnA, QnH (Q) series only (both link unit and CPU)

*1 When the A series CPU is in ROM operation, R register cannot be used.
*2 The unit number is required in addition to the memory type and address. Convert byte address into word address when entering the data on the V-SFT editor if the memory device of link unit is given byte address.

FX Series, FX1S Series

Memory		TYPE	Remarks
D	(data register)	0	
TN	(timer/current value)	1	
CN	(counter/current value)	2	
32CN	(counter 32 bits)	3	*1
M	(internal relay)	4	
S	(state)	5	
X	(input relay)	6	Read only
Y	(output relay)	7	
TS	(timer/contact)	8	
CS	(counter/contact)	9	
DX	(file register)	10	*2

*1 For numerical data format where double-words can be used (Num. Data Display, Graph, Sampling), data is processed as double-words.
For those where bits or words can be used, data is processed as words consisting of lower 16 bits.
For input Upper 16 bits are ignored.
For output “0” is written for upper 16 bits.

*2 Use DX for D1000 to 2999.

FX2N Series, FX-3UC Series

Memory		TYPE	Remarks
D	(data register)	0	
TN	(timer/current value)	1	
CN	(counter/current value)	2	
32CN	(counter 32 bits)	3	*1
M	(internal relay)	4	
S	(state)	5	
X	(input relay)	6	Read only
Y	(output relay)	7	
TS	(timer/contact)	8	
CS	(counter/contact)	9	
R	(extension register)	11	FX-3UC series CPU only

*1 For numerical data format where double-words can be used (Num. Data Display, Graph, Sampling), data is processed as double-words.
For those where bits or words can be used, data is processed as words consisting of lower 16 bits.
For input Upper 16 bits are ignored.
For output “0” is written for upper 16 bits.

FX Series (A Protocol)

Memory		TYPE	Remarks
D	(data register)	0	
TN	(timer/current value)	1	
CN	(counter/current value)	2	*1
32CN	(counter 32 bits)	3	*2
M	(internal relay)	4	
S	(state)	5	
X	(input relay)	6	Read only
Y	(output relay)	7	
TS	(timer/contact)	8	
CS	(counter/contact)	9	

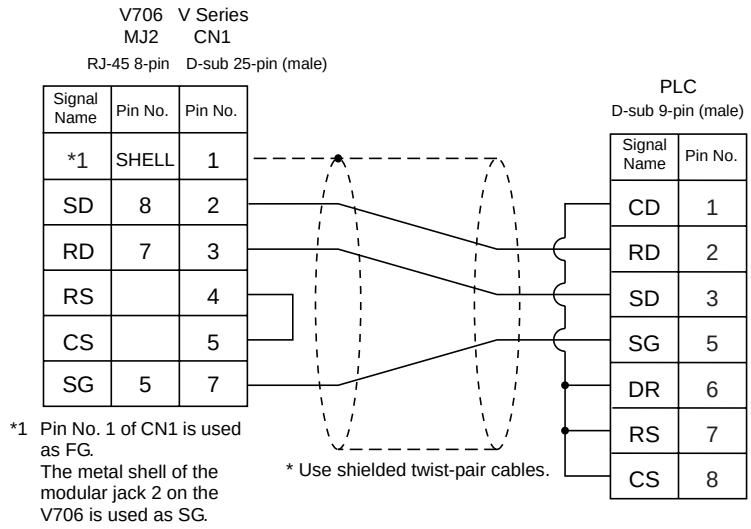
*1 CN200 to CN255 equals 32CN (32-bit counter).
*2 For numerical data format where double-words can be used (Num. Data Display, Graph, Sampling), data is processed as double-words.
For those where bits or words can be used, data is processed as words consisting of lower 16 bits.
For input Upper 16 bits are ignored.
For output "0" is written for upper 16 bits.

Wiring

Wiring diagrams with the PLC are shown below.

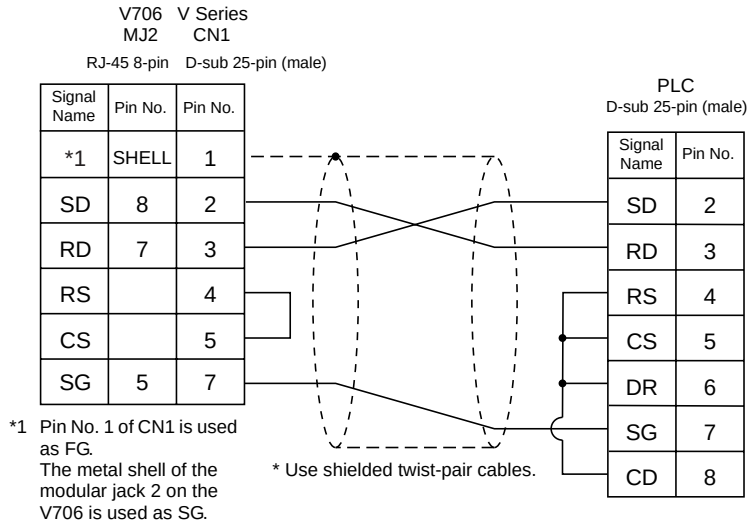
RS-232C

Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

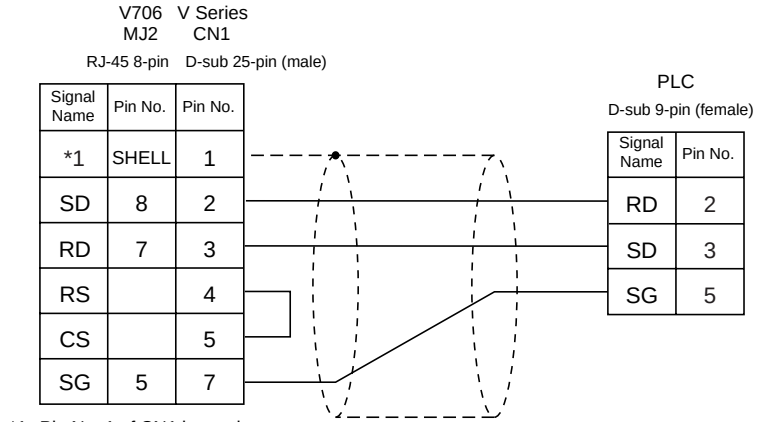
Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

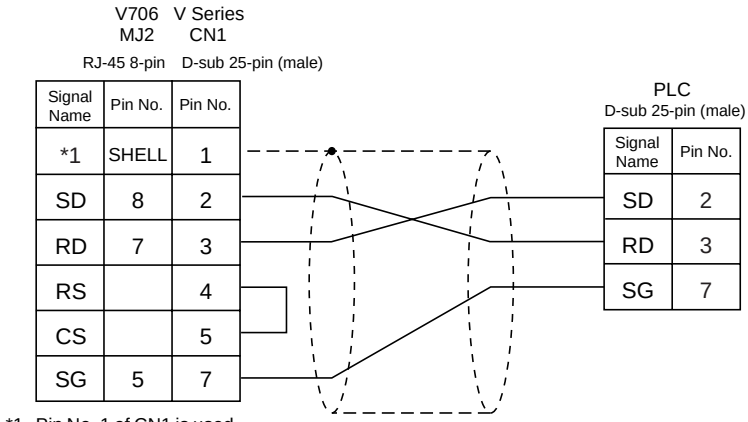
Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 4

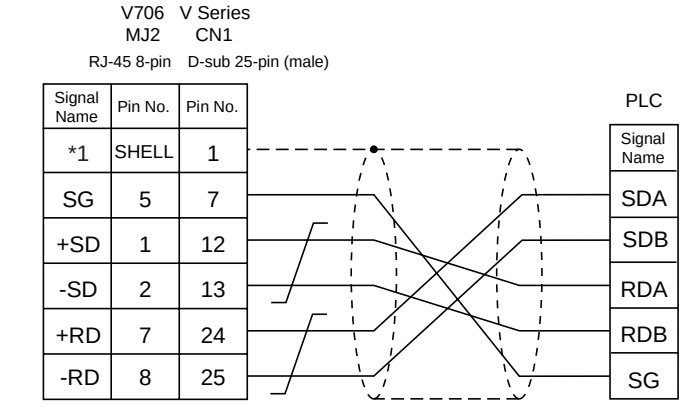


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-422

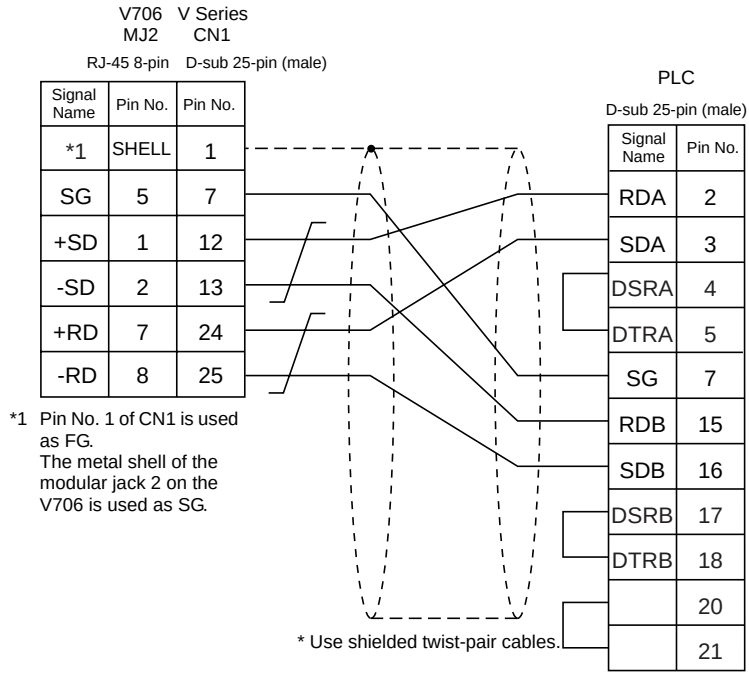
Wiring Diagram 5



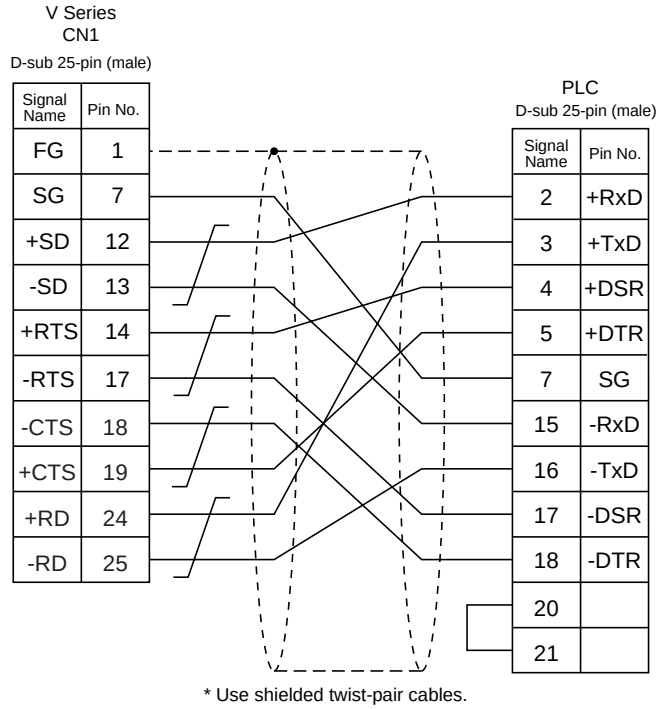
*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 6

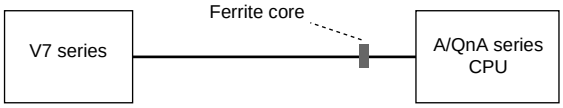


Wiring Diagram 7



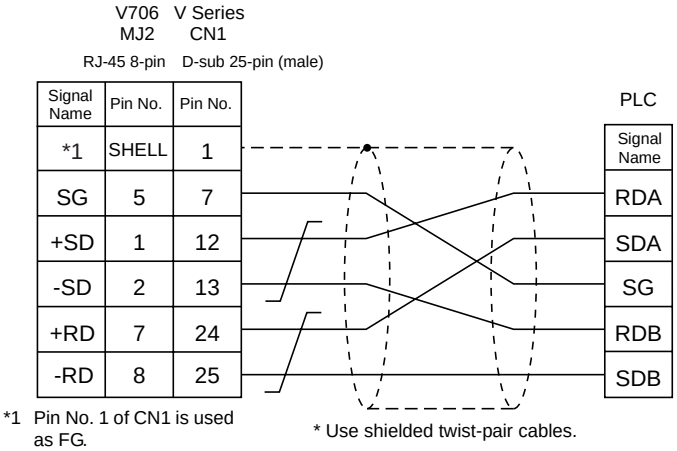
According to our noise tests, the attachment of a ferrite core improves noise voltage by 650 to 900 V and aids in preventing communication errors.

- When connecting to the A/QnA series CPU directly, attach a ferrite core to the communication cable between the V7 series and A/QnA series CPU to avoid noise problems.



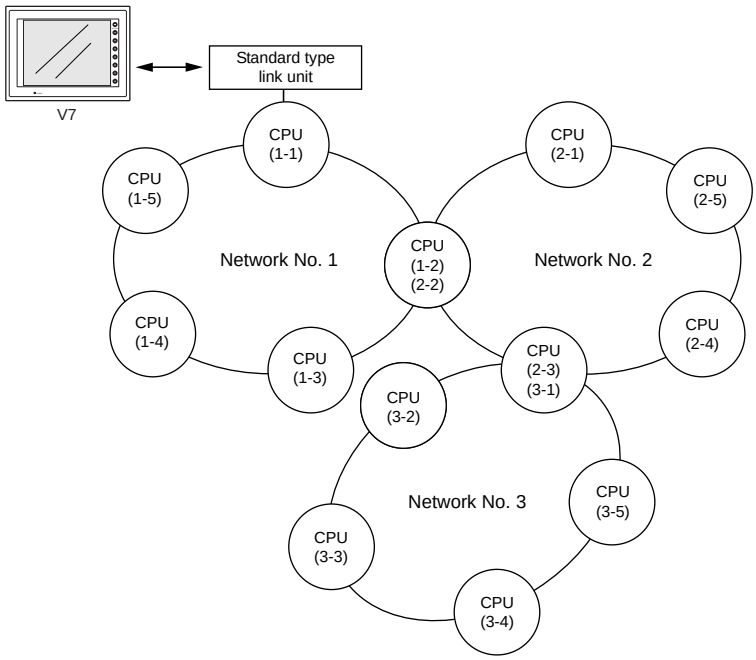
- Ferrite cores are optionally available.
  When ordering the ferrite core, state “GD-FC (ID: 8 mm, OD: 20 mm).”
- In consideration of such noise problems, it is recommended that the standard type link unit be used when the cable length of 15 m or longer is required.

Wiring Diagram 8



A Link + Net10

- When the V7 series is connected to the standard type link unit on the CPU that is connected to the data link system or network system, the V7 series can have access to CPUs on NET II (/B) and NET/10. In this case, select “A Link + Net10” for [PLC Type] on the VSFT editor.
- When the V7 series has access to the CPU on NET II (/B) or NET/10:
  - With NET II (/B), the V7 series can only have access to CPUs in the network (No. 1 in the illustration below) of the CPU equipped with the standard type link unit that is connected to the V7 series.
    (Available CPU No. 0 to 30)
  - With NET/10, the V7 series can have access to CPUs in the network (No. 1 in the illustration below) of the CPU equipped with the standard type link unit that is connected to the V7 series as well as those in the other networks (Nos. 2 and 3 in the illustration below) that are connected. (Available CPU No. 1 to 30)



- When the V7 series reads from or writes to the CPU (“1-1” in the above illustration) equipped with the standard type link unit:
  Set “31” for [CPU No.] for memory setting on the V-SFT editor.
  The response time is the same as that with 1 : 1 connection between the V7 series and the PLC.

  When the V7 series reads from or writes to the CPU memory of the CPU number other than “31”: Transient transmission is performed and the response time is not fast. Please understand beforehand.
- To have access to the PLC in the other network on NET/10, specify the network number in the OPEN macro for the screen on the V-SFT editor.
  This macro command should be [OUT_ENQ] of system call [SYS]. It is not possible to have access to the CPU on the different network from the same screen.

- Network specifying macro..... [OUT_ENQ] of system call [SYS]

  F1 memory

n + 0	Always 0
n + 1	Network selection: 2
n + 2	System code
n + 3	Network number

  “n + 0” and “n + 1” are fixed to “0” and “2”, respectively.
  “n + 2” (system code) should be: 1: NET/10 2: NET II (/B)
  For “n + 3” (network number), set “0” when NET II (/B) is selected for “n + 2” (system code) or the network number to be accessed when NET/10 is selected.

  Do not use this macro for any purpose other than OPEN macro for a screen. Doing so triggers network switching at the time of macro execution, resulting in a communication error.

  For more information on the macro function, refer to the Reference Manual (Function).
  Also refer to the explanation on network registration contained in the operation manual for MITSUBISHI’s Standard Link/Multi-drop Link Unit.

- For the NET II (/B) data link system and NET/10 network system, refer to MITSUBISHI’s manual.

Available Memory

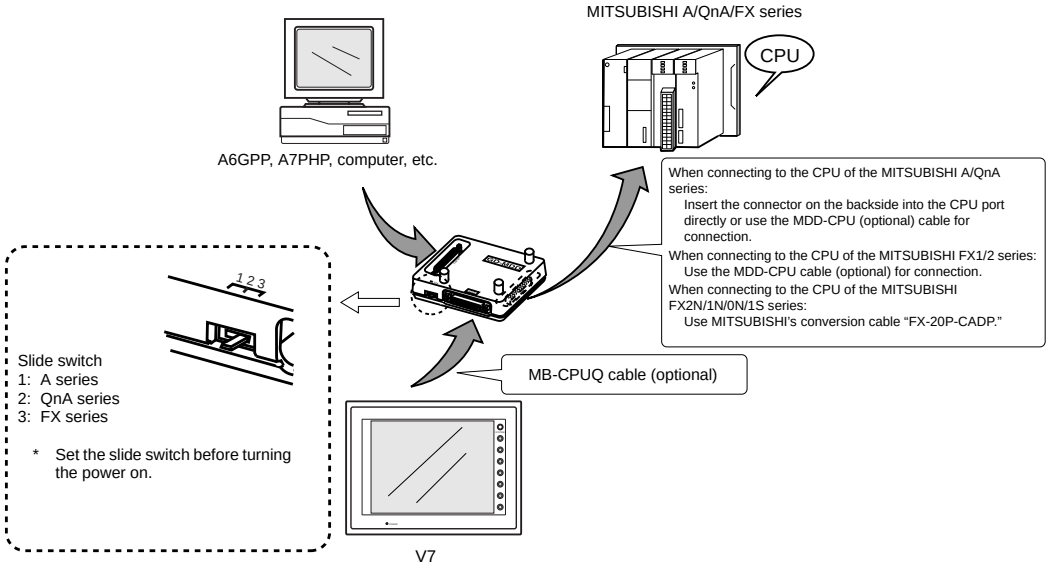
For the available memory of the PLC to be accessed, refer to “Available Memory” (page 16-7).
Note that the CPU number must be set on the V-SFT editor.

Wiring

Refer to the wiring diagram with the standard type link unit.

V-MDD (Dual Port Interface)

V-MDD is the add-on connector with two ports, specifically designed for the connector on MITSUBISHI's A series, QnA series or FX series CPU programming port.



* V-MDD cannot be used with the MI4-FX cable.

- The power to the V-MDD is supplied from the CPU. Check the electric capacity of 5 V at the CPU. (Current consumption: Max. 350 mA)
- Keep the cable between the CPU and V-MDD as short as possible. (Max. 1 to 1.5 m)
- Be sure to consider noise problems when performing wiring.
- When V-MDD is used for connection with the V7 series, set 1.5 seconds or above for the timeout time in the [Comm. Parameter] dialog.
- Please read the instruction manual for V-MDD before use.

17. MODICON PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
Modbus RTU	Modbus RTU	Modbus	RS-232C [Wiring Diagram 1]	×	×

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Port		1	1
Parity		Even	Even
Transmission code	Data length	8	8
	Stop bit	1	1

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

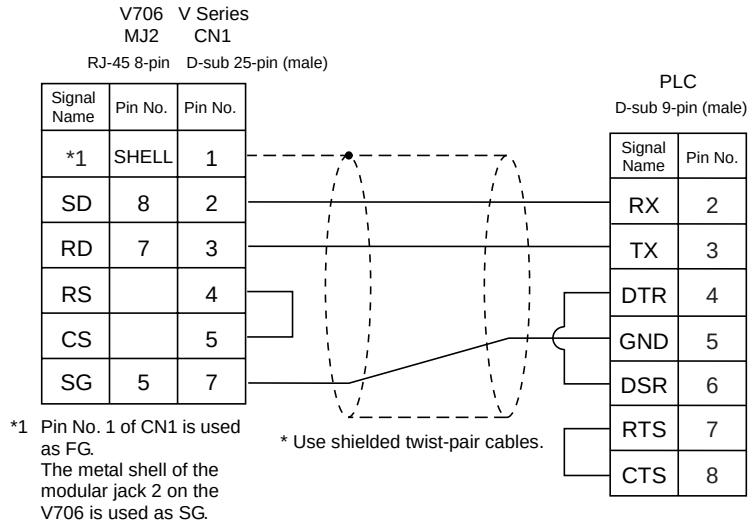
Memory		TYPE	Remarks
4	(holding register)	0	
3	(input register)	1	
0	(output coil)	4	
1	(input relay)	6	Read only

Wiring

Wiring diagram with the PLC is shown below.

RS-232C

Wiring Diagram 1



18. MOELLER PLC

Available PLCs

Select PLC Type	PLC	Connection	PLC2Way	Ladder Transfer
PS4	PS4-201-MM1 (PRG port)	RS-232C [Wiring Diagram 1] + ZB4-303-KB1 Cable made by MOELLER	×	×

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Port		1	1
Parity		Not provided	Not provided
Transmission code	Data length	8	8
	Stop bit	1	1

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

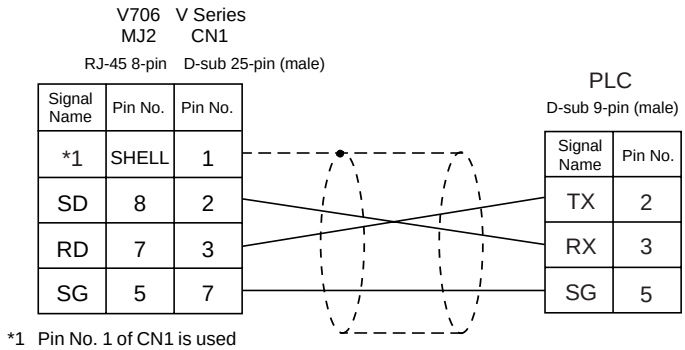
Memory	TYPE	Remarks
M (marker)	0	MW as word device

Wiring

Wiring diagram with the PLC is shown below.

RS-232C

Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

19. OMRON PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer*4
SYSMAC C	C20H,C28H,C40H	RS-232C port	RS-232C [Wiring Diagram 1]	○	○
	C120, C120F C200H C500, C500F C1000H C2000, C2000H	C120-LK201-V1 C120-LK202-V1	RS-232C [Wiring Diagram 3]	○	
			RS-422 [Wiring Diagram 4]	×	
	C200H C200HS-CPU01, 03 C200HS-CPU21, 23 C200HS-CPU31, 33	C200H-LK201 C200H-LK201-V1 C200H-LK202 C200H-LK202-V1	RS-232C [Wiring Diagram 3]	○	
			RS-422 [Wiring Diagram 4]	×	
	C200HS-CPU21, 23 C200HS-CPU31, 33 CQM1-CPU21 CQM1-CPU41, 42, 43, 44	RS-232C port	RS-232C [Wiring Diagram 2]	○	
	C500, C500F C1000H C2000, C2000H	C500-LK203	RS-232C [Wiring Diagram 3]	○	
			RS-422 [Wiring Diagram 4]	×	
	C200HX C200HG C200HE	RS-232C port	RS-232C [Wiring Diagram 2]	○	
		Mounted on the CPU slot (C200HW-COM02 to 06)	RS-232C [Wiring Diagram 2]	○	
			RS-422 [Wiring Diagram 5]	×	
	SRM1-C02	RS-232C port	RS-232C [Wiring Diagram 2]	○	
	CPM1A	CPU unit (peripheral port)	OMRON's cable [CQM1-CIF01]*1, *2	○	
	CPM2A	RS-232C port	RS-232C [Wiring Diagram 2]	○	
		CPU unit (peripheral port)	OMRON's cable [CQM1-CIF01]*1, *2	○	
	CPM2C	CPU unit (peripheral port)	OMRONs adaptor unit [CPM2C-CIF01] + RS-232C [Wiring Diagram 2]	○	
			OMRON's cable [CS1W-CN118] + RS-232C [Wiring Diagram 2]	○	
SYSMAC CV	CV500, CV1000 CV2000 CVM1	CPU unit with built-in port (hose link port)	RS-232C [Wiring Diagram 2]	○	×
			RS-422 [Wiring Diagram 6]	×	
		CV500-LK201	RS-232C PORT1 [Wiring Diagram 3]	○	
			PORT2 [Wiring Diagram 2]	○	
			RS-422 PORT2 [Wiring Diagram 5]	×	
SYSMAC CS1/CJ1 SYSMAC CS1/CJ1 DNA*3	CS1	RS-232C port	RS-232C [Wiring Diagram 2]	○	○
		CS1W-SCU21			
		Mounted on the CPU slot (CS1W-SCB21)			
		Mounted on the CPU slot (CS1W-SCB41)	RS-422 [Wiring Diagram 7]	×	
	CJ1H, CJ1M	RS-232C port	RS-232C [Wiring Diagram 2]	○	
		CJ1W-SCU41	RS-232C [Wiring Diagram 2]	○	
			RS-422 [Wiring Diagram 7]	×	

*1 Replace the shell on the D-sub 25-pin side before use. (Recommended part: DDK's 17J-25)
*2 For connection to MJ2 of a V706, use an MJ2-PLC adaptor plus CQM1-CIF01.
*3 For SYSMAC CS1/CJ1 DNA, refer to page 19-8.
*4 For the ladder transfer function, refer to "Appendix 8 Ladder Transfer Function."

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate*		19200 bps	19200 bps
Port		0	0
Parity		Even	Even
Transmission code	Data length	7 (ASCII)	7
	Stop bit	2	2
Command level		3 (fixed)	–
Protocol		1 : n protocol (fixed)	–
Synchronizing switch		Internal synchronization (fixed)	–
CTS switch		0 V (always ON) (fixed)	–
5 V supply switch		OFF (fixed)	–
Terminating resistance		ON for RS-422	–

* The maximum baud rate available with the V7 series is 115200 bps.
Select the appropriate baud rate depending on the used PLC and environment.

V-SFT Setting

Set [Trans. Mode] in the [Detail] tab window of the [Comm. Parameter] dialog of the V-SFT editor.

Transmission Mode	Contents
Trans. Mode 1	BCD w/o sign
Trans. Mode 2	BCD w/ signs*1

*1 BCD w/ signs
Data in the PLC memory can be shown as data with signs.

When higher 4 bits in the memory indicates [F] or [A], it is treated as negative.
[F]: Regards higher 4 bits as [–0].
[A]: Regards higher 4 bits as [–1].

- Displayable range 1 word: –1999 to +9999
  2 words: –19999999 to +99999999

  Example:

PLC Memory	Indication on V7
0000 to 9999	0 to 9999
F001 to F999	–1 to –999
A000 to A999	–1000 to –1999
00000000 to 99999999	0 to 99999999
F0000001 to F9999999	–1 to –9999999
A0000000 to A9999999	–10000000 to –19999999

- Setting procedure: Num. Data Display [Input Type] BCD
  [Display Type] DEC (w/ –sign, w/ +–signs)

Available Memory

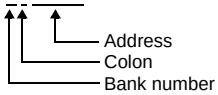
The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

SYSMAC C

Memory		TYPE	Remarks
DM	(data memory)	0	
CH	(input/output relay)	1	
HR	(holding relay)	2	
LR	(latch relay)	3	
AR	(auxiliary memory relay)	4	
T	(timer/current value)	5	
C	(counter/current value)	6	
EMn	(extended data memory)	7	*1
TU	(timer/contact)	9	Read only
CU	(counter/contact)	10	Read only

*1 When using EMn (extended data memory), specify the bank number (C: 0 to 7).
The assigned memory is indicated when editing the screen as shown on the right.

Example: EM0 : 30000

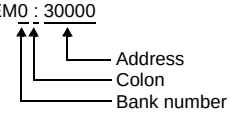


SYSMAC CV

Memory		TYPE	Remarks
DM	(data memory)	0	
CH	(input/output relay)	1	
AR	(alarm relay)	4	
T	(timer/current value)	5	
C	(counter/current value)	6	
EMn	(extended data memory)	7	*1
TU	(timer/contact)	9	Read only
CU	(counter/contact)	10	Read only

*1 When using EMn (extended data memory), specify the bank number (CV: 0 to 7).
The assigned memory is indicated when editing the screen as shown on the right.

Example: EM0 : 30000

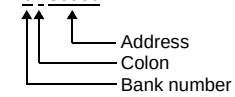


SYSMAC CS1/CJ1, SYSMAC CS1/CJ1 DNA

Memory		TYPE	Remarks
DM	(data memory)	0	
CH	(input/output relay)	1	
H	(holding relay)	2	
A	(alarm relay)	4	
T	(timer/current value)	5	
C	(counter/current value)	6	
EMn	(extended data memory)	7	*1
W	(internal relay)	8	
TU	(timer/contact)	9	Read only
CU	(counter/contact)	10	Read only

*1 When using EMn (extended data memory), specify the bank number (CS1: 0 to C).
The assigned memory is indicated when editing the screen as shown on the right.

Example: EM0 : 30000

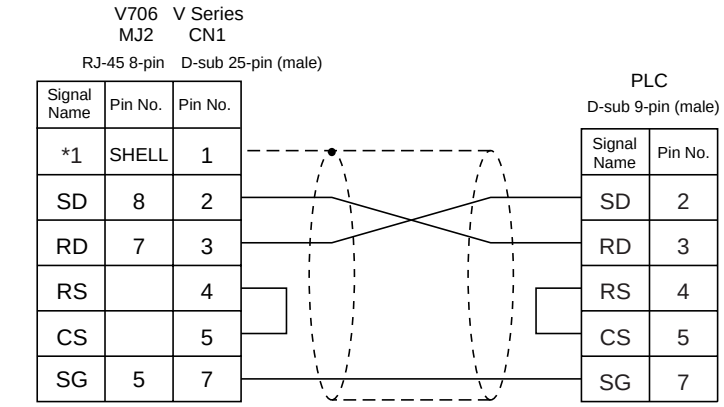


Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

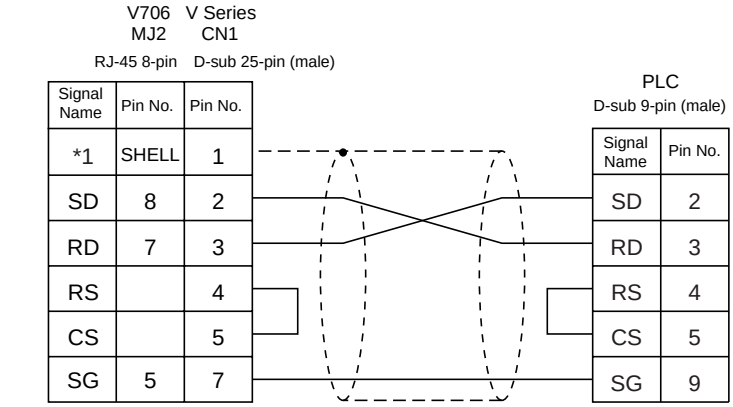
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

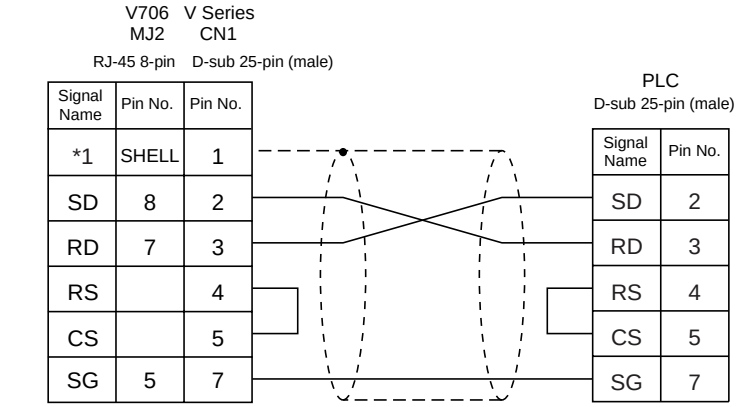
Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 3

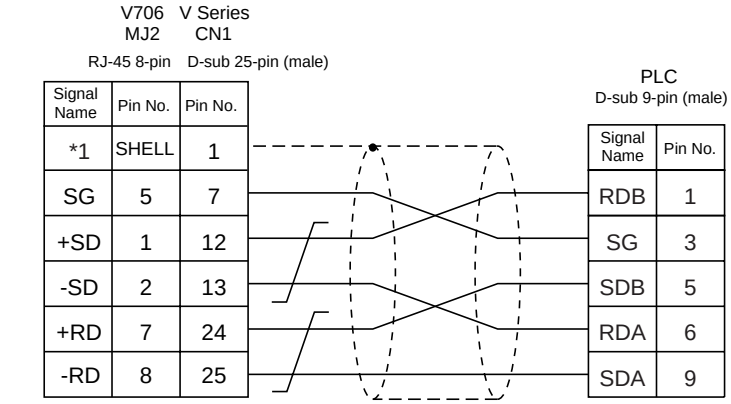


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-422

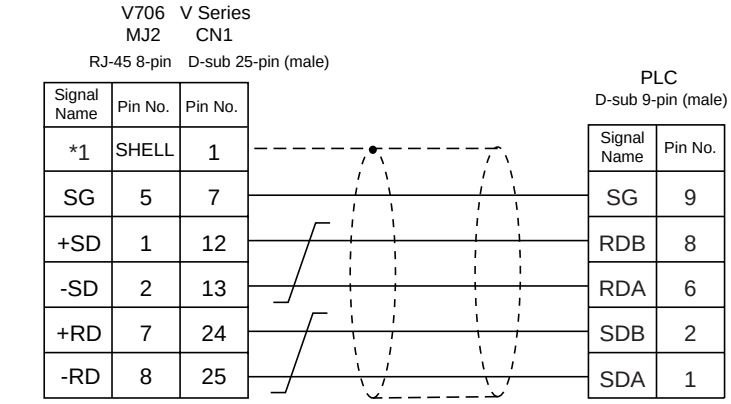
Wiring Diagram 4



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

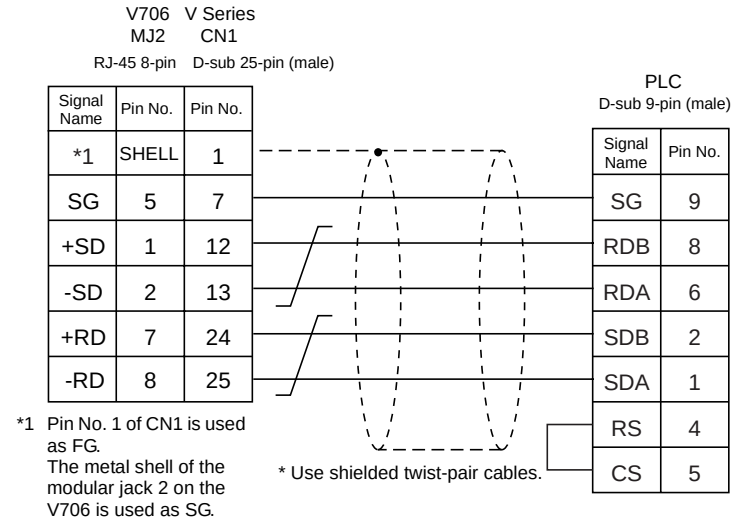
Wiring Diagram 5



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

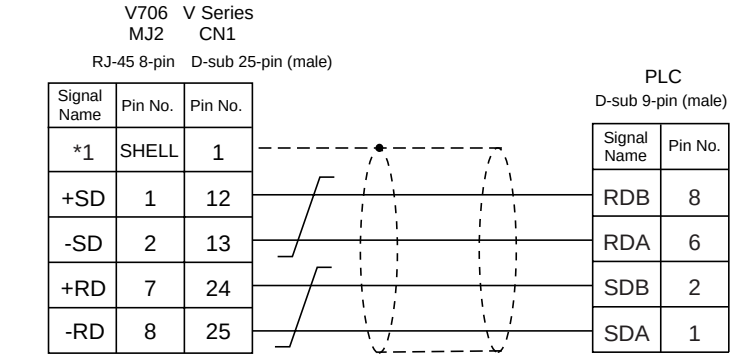
* Use shielded twist-pair cables.

Wiring Diagram 6



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

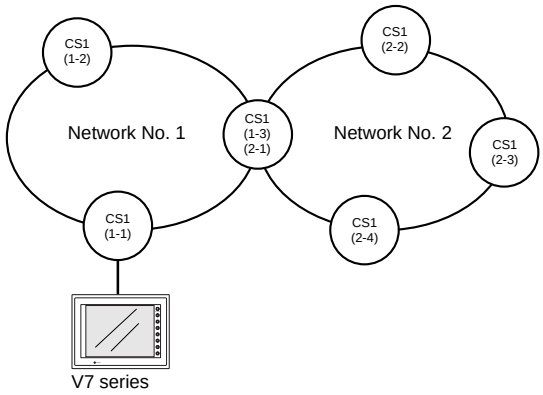
Wiring Diagram 7



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

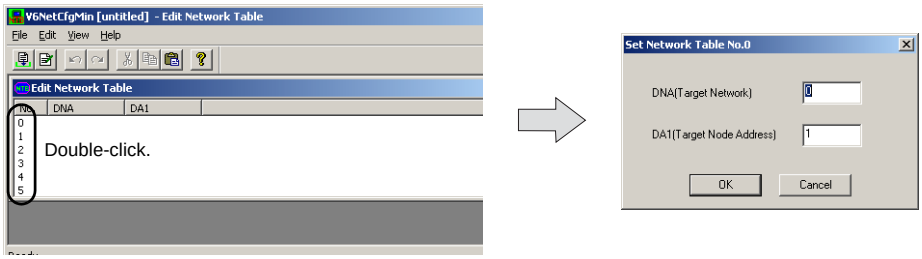
SYSMAC CS1/CJ1 DNA

When connecting the V7 series to CS1/CJ1 on a network (Controller Link), the V7 series can also access another CS1 on the network.



V-SFT Setting

- Select [System Setting] → [Comm. Parameter] → [Detail] tab, and select [1 : n] for [Connection].
- Select [System Setting] → [Network Table Setting] → [PLC]. The network table edit window is displayed.
  Double-clicking on the number brings up the dialog where CS1/CJ1 on the network can be registered.



20. SAIA PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
PCD	PCD1	PGU port	RS-232C [Wiring Diagram 1]	×	×
		PCD7.F120	RS-232C [Wiring Diagram 2]		
		PCD4.F110	RS-485 [Wiring Diagram 3]		

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		0	1
Transmission code	Data length	8	8
	Stop bit	1	1

S-BUS Configuration

S-BUS Mode Parity
GU Port Number 0 (PGU port), 1 (PCD7.F120, PCD4.F110)

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

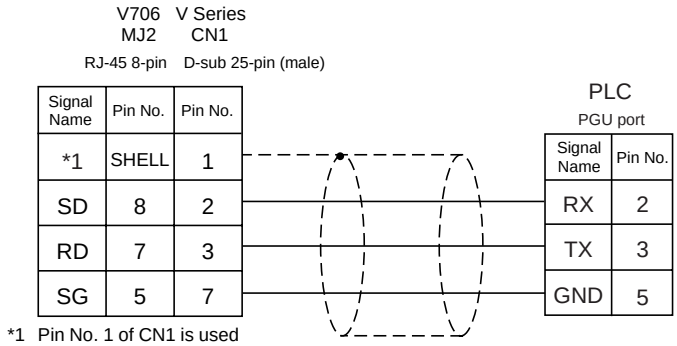
Memory		TYPE	Remarks
R	(register word)	0	
Rfp	(float)	1	
T	(timer-counter word)	2	
C	(timer-counter coil)	3	
I	(input bit)	4	read only
O	(output bit)	5	
F	(flag bit)	6	

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

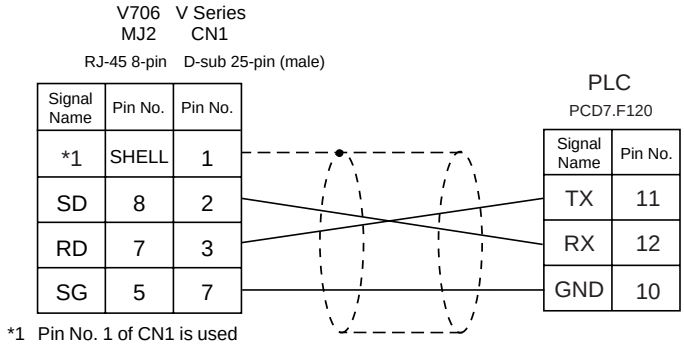
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 2

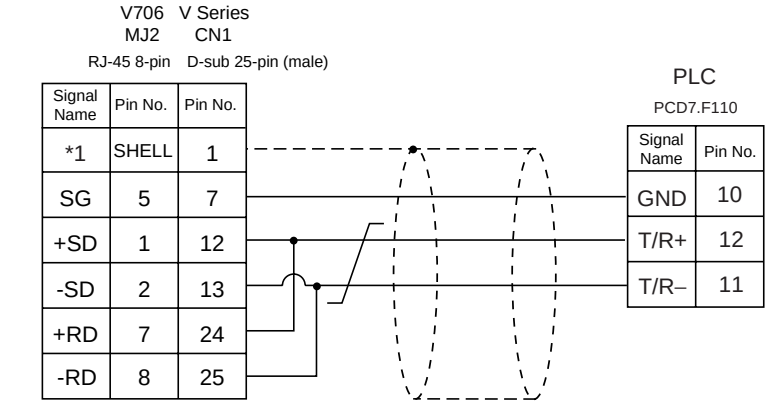


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-485

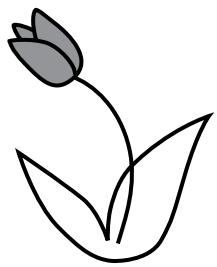
Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

MEMO



Please use this page freely.

21. SAMSUNG PLC

Available PLCs

Select PLC Type	PLC	Connection	PLC2Way	Ladder Transfer
SPC series	SPC series	RS-232C [Wiring Diagram 1] RS-422/485 [Wiring Diagram 2]	×	×

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item	Setting on PLC	V7 Comm. Parameter Setting
Baud rate	9600 bps	9600 bps
Parity	Not provided	Not provided
Stop bit	1	1
Terminating resistance	ON for RS-485	–

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

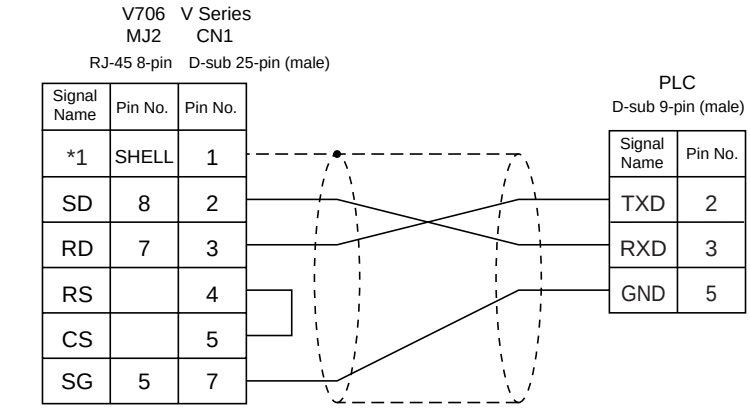
Memory		TYPE	Remarks
R	(input/output)	0	
L	(link relay)	1	
M	(internal relay)	2	
K	(keep relay)	3	
F	(special relay)	4	
W	(data register)	5	

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

Wiring Diagram 1

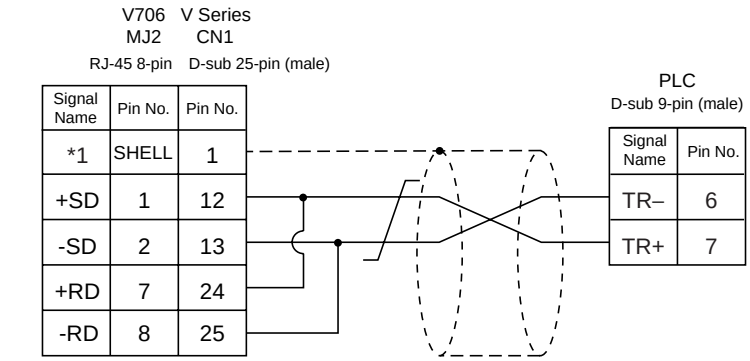


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-422

Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

22. SHARP PLC

Available PLCs

<table>
<tr><th>Select PLC Type</th><th colspan="2">CPU</th><th>Unit/Port</th><th>Connection</th><th>PLC2Way</th><th>Ladder Transfer*2</th></tr>
<tr><td rowspan="8">JW series</td><td colspan="2">W70H, W100H
JW50, JW70, JW100
JW50H, JW70H, JW100H</td><td>ZW-10CM
JW-10CM</td><td>RS-422 [Wiring Diagram 5]</td><td rowspan="15">○</td><td rowspan="19">×</td></tr>
<tr><td colspan="2">JW20, JW20H, JW30H</td><td>JW-21CM</td><td>RS-422 [Wiring Diagram 5]</td></tr>
<tr><td rowspan="2">JW10</td><td rowspan="2">JW-1324K,
JW-1342K
JW-1424K,
JW-1442K
JW-1624K,
JW-1642K</td><td>MMI port</td><td>RS-422 [Wiring Diagram 6]</td></tr>
<tr><td>Communication port</td><td>RS-422 [Wiring Diagram 7]</td></tr>
<tr><td rowspan="2">JW30H</td><td rowspan="2">JW-32CUH
JW-32CUH1
JW-32CUM1
JW-33CUH
JW-33CUH1
JW-33CUH2
JW-33CUH3</td><td>PG/COMM1 port</td><td>RS-422 [Wiring Diagram 11]</td></tr>
<tr><td>PG/COMM2 port</td><td>RS-232C [Wiring Diagram 2]
RS-422 [Wiring Diagram 11]</td></tr>
<tr><td>J-board</td><td>Z-331J, Z-332J</td><td>Host communication port T1</td><td>RS-422 [Wiring Diagram 8]</td></tr>
<tr><td rowspan="4">JW100/70H COM port</td><td>JW70</td><td>JW-70CU</td><td rowspan="2">Communication port</td><td rowspan="2">RS-232C [Wiring Diagram 1]
RS-422 [Wiring Diagram 9]</td></tr>
<tr><td>JW100</td><td>JW-100CU</td></tr>
<tr><td>JW70H</td><td>JW-70CUH</td><td rowspan="2">Communication port</td><td rowspan="2">RS-232C [Wiring Diagram 1]
RS-422 [Wiring Diagram 10]</td></tr>
<tr><td>JW100H</td><td>JW-100CUH</td></tr>
<tr><td rowspan="5">JW20 COM port</td><td>JW20H</td><td>JW-22CU</td><td>Communication port</td><td>RS-232C [Wiring Diagram 1]
RS-422 [Wiring Diagram 9]</td></tr>
<tr><td rowspan="3">J-board</td><td rowspan="2">Z-311J
Z-312J</td><td>Host communication port CN3</td><td>RS-232C [Wiring Diagram 3]</td></tr>
<tr><td>Host communication port TC1</td><td>RS-422 [Wiring Diagram 12]</td></tr>
<tr><td>Z-511J</td><td rowspan="2">PG/COMM1 port
PG/COMM2 port</td><td rowspan="2">RS-422 [Wiring Diagram 11]</td></tr>
<tr><td>Z-512J</td></tr>
<tr><td rowspan="3">JW300 series</td><td colspan="2" rowspan="3">JW-311CU*1, JW-312CU*1,
JW-321CU, JW-322CU,
JW-331CU, JW-332CU,
JW-341CU, JW-342CU,
JW-352CU, JW-362CU</td><td>PG/COMM1 port</td><td>RS-232C [Wiring Diagram 4]
RS-422 [Wiring Diagram 11]</td><td rowspan="3">×</td></tr>
<tr><td>PG/COMM2 port</td><td>RS-232C [Wiring Diagram 2]
RS-422 [Wiring Diagram 11]</td></tr>
<tr><td>JW-21CM</td><td>RS-422 [Wiring Diagram 5]</td></tr>
</table>

*1 Not provided with PG/COMM2 port
*2 For the ladder transfer function, refer to “Appendix 8 Ladder Transfer Function.”

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

JW Series/JW100/70H COM Port/JW20 COM Port

Item	Setting on PLC	V7 Comm. Parameter Setting
Baud rate	19200 bps	19200 bps
Port	0 for STA.NO ×10, 1 for STA.NO ×1	1
Parity	Even	Even
Data length	7	7
Stop bit	2	2
Error check	Sumcheck (fixed)	–
Transmission mode	Computer link (fixed)	–

* For JW-10CM or ZW-10CM:
  In the [Comm. Parameter] dialog of the V-SFT editor, set [Send Delay Time] to 1 msec or more.

* For JW10 series with MMI port or communication port:
  Turn off the terminating resistances of the V series.
  - V712/V710/V708: DIPSW5, 7
  - V706 (MJ2): DIPSW2, 3
  - V706 (DU-01): DIPSW1, 2

JW300 Series

Item	Setting on PLC	V7 Comm. Parameter Setting
Baud rate	19200 bps	19200 bps
Port	1	1
Parity	Odd	Odd
Data length	7	7
Stop bit	2	2
Error check	Sumcheck (fixed)	–
Transmission mode	Computer link (fixed)	–

JW Series: Switch Setting

JW-10CM, ZW-10CM, JW-21CM

Switch	Setting	Contents
SW0	4	Computer link (command mode)
SW1	1	Station address (lower half)
SW2	0	Station address (upper half)
SW3-1	OFF	Not used
SW3-2	ON	4-wire system
SW3-3	OFF	Not used
SW3-4	ON	Even parity
SW4	0	Baud rate 0: 19200 1: 9600 2: 4800 3: 2400 4: 1200 5: 600
SW7	ON	Terminating resistance provided

Z-331J, Z-332J

Switch	Setting	Contents
SW0	4	Command mode
SW1	1	Station address (lower half)
SW2	0	Station address (upper half)
SW3-1	OFF	Not used
SW3-2	OFF	2-wire system only
SW3-3	OFF	Not used
SW3-4	ON	Even parity
SW4	0	Baud rate 0: 19200 1: 9600 2: 4800 3: 2400 4: 1200 5: 600
SW7	ON	Terminating resistance provided

JW Series, JW100/70H COM Port, JW20 COM Port, JW300 Series: System Memory Setting

The settings for communications with the V7 series should be made at the system memory as shown below.

JW-10

- MMI port

System Memory	Setting	Contents
#226	30H	Data length: 7bits, stop bit: 2 bits Parity: even, baud rate: 19200
#227	01H	Port number

- Communication port

System Memory	Setting	Contents
#234	00H	Computer link mode
#236	30H	Data length: 7bits, stop bit: 2 bits Parity: even, baud rate: 19200
#237	01H	Port number

JW-70CU/100CU, JW70CUH/100CUH, JW-22CU, Z-311J, Z-312J

System Memory	Setting	Contents
#236	30H	Stop bit: 2 bits, parity: even, baud rate: 19200
#237	01H	Port number

JW-30H, Z-511J, Z-512J

- PG/COMM1 port

System Memory	Setting	Contents
#234	30H	Stop bit: 2 bits, parity: even, baud rate: 19200
#235	01H	Port number

- PG/COMM2 port

System Memory	Setting	Contents
#236	30H	Stop bit: 2 bits, parity: even, baud rate: 19200
#237	01H	Port number

JW300 Series

- PG/COMM1 port

System Memory	Setting	Contents
#234	29H	Stop bit: 2 bits, parity: odd, baud rate: 19200
#235	01H	Port number

- PG/COMM2 port

System Memory	Setting	Contents
#236	29H	Stop bit: 2 bits, parity: odd, baud rate: 19200
#237	01H	Port number

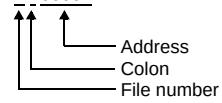
Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

Memory		TYPE	Remarks
X9XXX	(register)	0	
XXXXX	(relay)	1	⊐ for word device
EXXXX	(self diagnosis)	2	
bXXXX	(timer, counter/current value)	3	
Fn	(file register)	7	*1

*1 File register setting on V-SFT editor
Enter “file number” + “: (colon)” + “address” in order.

Example: F1 : 00002

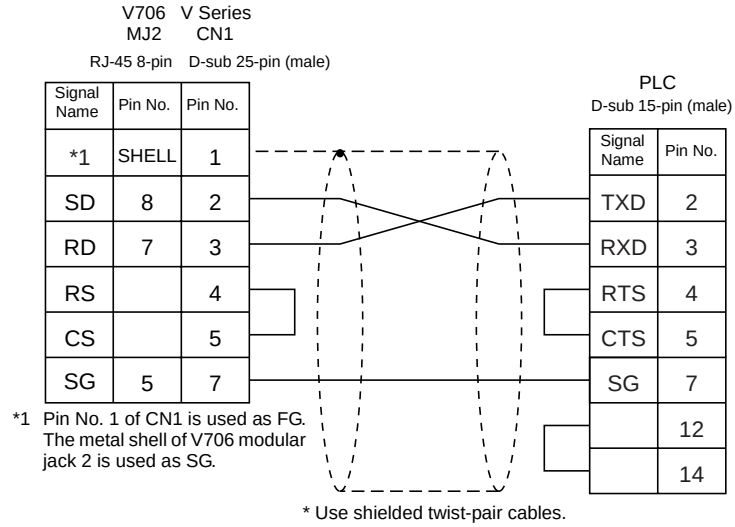


Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

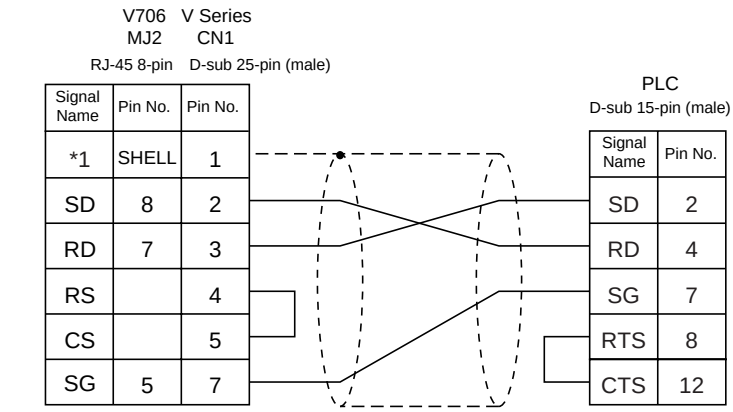
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

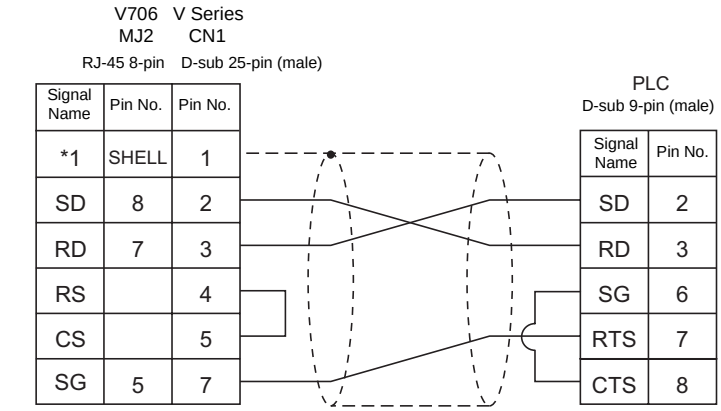
Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

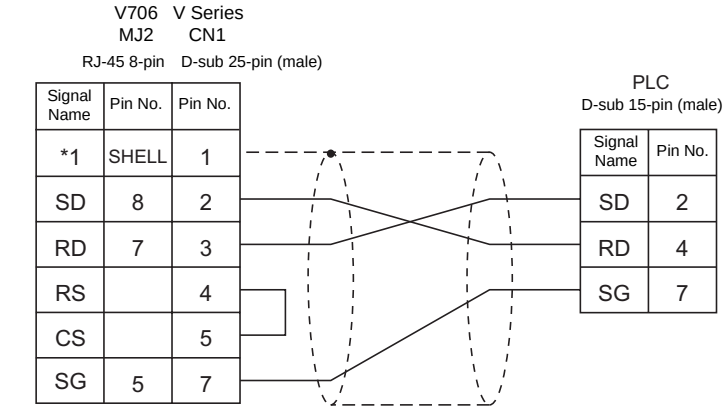
Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 4



*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

RS-422

Wiring Diagram 5

V706 MJ2 RJ-45 8-pin — V Series CN1 D-sub 25-pin (male)

Signal Name	Pin No.	Pin No.
*1	SHELL	1
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25

PLC

Signal Name
L1
L2
L3
L4
GND

*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 6

V706 MJ2 RJ-45 8-pin — V Series CN1 D-sub 25-pin (male)

Signal Name	Pin No.	Pin No.
*1	SHELL	1
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25

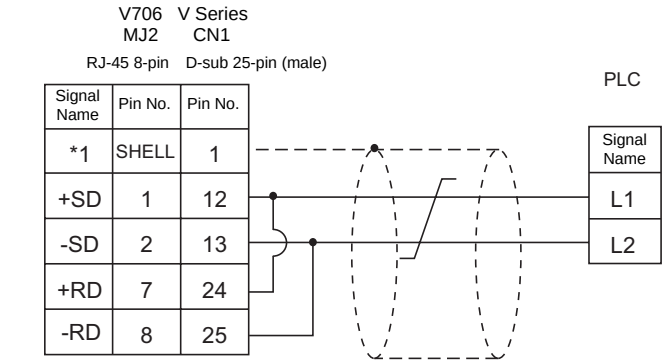
PLC D-sub 9-pin (male)

Signal Name	Pin No.
RX	2
TX	3
PG/COMM	4
GND	5
-RX	7
-TX	8

*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

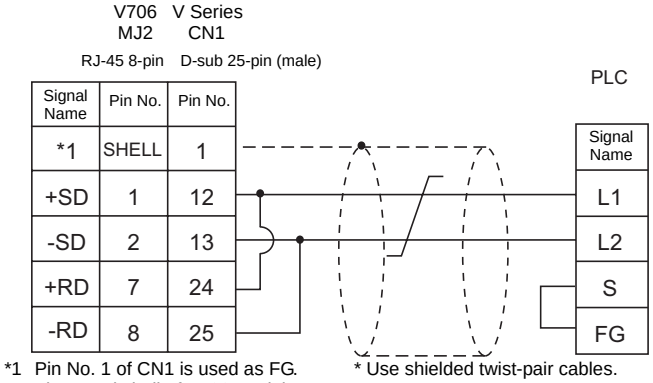
Wiring Diagram 7



*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

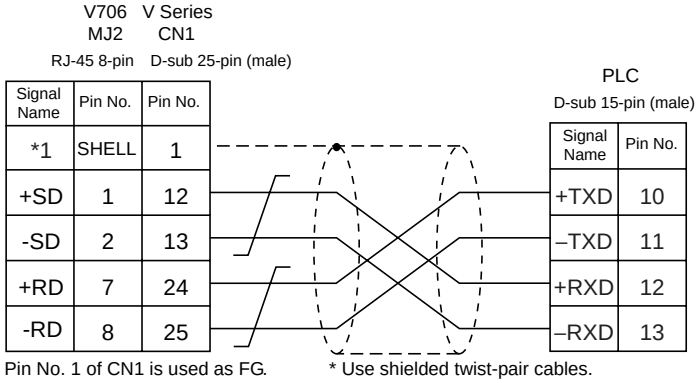
Wiring Diagram 8



*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 9



*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 10

V706 V Series
MJ2 CN1
RJ-45 8 pin D-sub 25-pin (male)

Signal Name	Pin No.	Pin No.
*1	SHELL	1
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25

PLC
D-sub 15-pin (male)

Signal Name	Pin No.
Terminating resistance	6
+TXD	10
–TXD	11
+RXD	12
–RXD	13

*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 11

V706 V Series
MJ2 CN1
RJ-45 8-pin D-sub 25-pin (male)

Signal Name	Pin No.	Pin No.
*1	SHELL	1
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25

PLC
D-sub 15-pin (male)

Signal Name	Pin No.
+SD	3
+RD	9
–RD	10
–SD	11

*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 12

V706 V Series
MJ2 CN1
RJ-45 8-pin D-sub 25-pin (male)

Signal Name	Pin No.	Pin No.
*1	SHELL	1
+SD	1	12
-SD	2	13
+RD	7	24
-RD	8	25

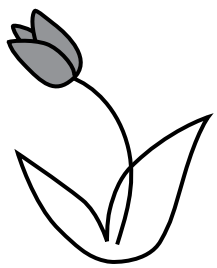
PLC
Terminal block

Signal Name	Pin No.
TD	1
/TD	2
RD	3
/RD	4

*1 Pin No. 1 of CN1 is used as FG. The metal shell of V706 modular jack 2 is used as SG.

* Use shielded twist-pair cables.

MEMO



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23. SHINKO ELECTRIC PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
SELMART	SELMART-100 and later	Version 01M2-UCI-6□	RS-232C [Wiring Diagram 1]	×	×

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Parity		Even	Even
Transmission code	Data length	7 (ASCII)	7
	Stop bit	1	1
Sumcheck		Provided (fixed)	–

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

Memory	TYPE	Remarks
D (data register)	0	

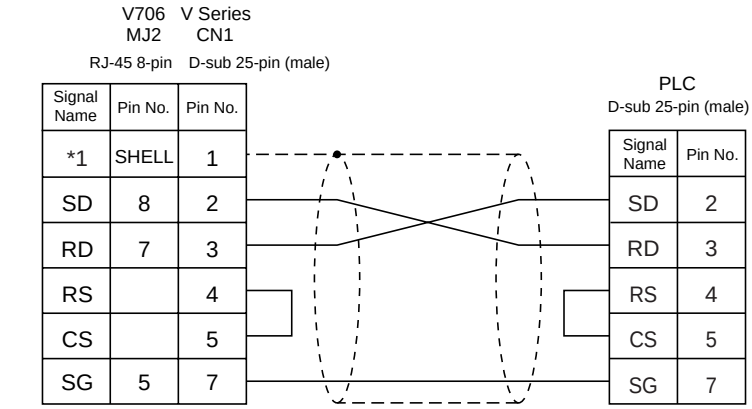
* Only D register of SELMART is available. No other devices can be used. Be sure to note the above though the setting on the V-SFT editor is possible.

Wiring

Wiring diagram with the PLC is shown below.

RS-232C

Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

24. Siemens PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
S5 (S5 V4)	S5-90U S5-95U S5-100U	CP-521SI (3964R Transmission Protocol)	RS-232C [Wiring Diagram 1]		
	S5-115U S5-135U S5-155U	CP-524 (3964R/RK512) CP-544 (3964R/RK512)	RS-232C [Wiring Diagram 1] RS-422 [Wiring Diagram 6]		
	S5-95U	Second serial interface (3964R Transmission Protocol)	SIEMENS's 6ES5 734-1BD20 cable*1 + RS-232C [Wiring Diagram 3]		
S5 PG port	S5 series	Programming port on the CPU unit*2			
S7	S7-300	CP-341 (3964R/RK512)	RS-232C [Wiring Diagram 2] RS-422 [Wiring Diagram 6]		
	S7-400	CP-441 (3964R/RK512)			
S7-200 PPI	S7-200 series	PPI	RS-422 [Wiring Diagram 7]		
S7-300/400MPI	S7-300/400 series	MPI port	RS-422 [Wiring Diagram 9]	×	×
S7-300MPI (V-MPI)		MPI (MPI/DP)	Hakko Electronics's "V-MPI" Convert adapter + SIEMENS's 6XV1 830-0EH10 cable + Recommended connector*3		
S7-300MPI (HMI ADP)	S7-300/400 series (MPI port)	SIEMENS's HMI Adapter 6ES7 972 0CA11-0XA0	RS-232C [Wiring Diagram 5]		
S7-300MPI (PC ADP)		SIEMENS's PC Adapter 6ES7 9720CA23-0XA0			
S7-300MPI (Helmholz SSW7 ADP)		Helmholz's Adapter fur MPI-Bus SSW7			
TI500/505 (TI500/505V4)	TI545/555	CPU port (bulit-in)	RS-232C [Wiring Diagram 4] RS-422 [Wiring Diagram 8]		

*1 When using the 6ES5 734-1BD20 cable made by Siemens, connect the cable shown in [Wiring Diagram 3] to the D-sub 25-pin side of the 6ES5 734-1BD20 cable for communications with the V7 series.
*2 135U/921 not supported
*3 For more information about the V-MPI, refer to the "V-MPI OPERATING INSTRUCTIONS."

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

S5, S5 V4 (S5-90U, S5-95U, S5-100U)

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Parity		Even parity	Even
Transmission code	Data length	8	8
	Stop bit	1	1
Busy signal		NO (fixed)	–
Hand shake		OFF (fixed)	–

S5, S5 V4 (S5-115U, S5-135U, S5-155U), S7 (S7-300, S7-400)

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Parity		–	Even (fixed)
Transmission code	Data length	–	8 (fixed)
	Stop bit	–	1 (fixed)

S5 PG Port

Communication parameters are automatically set.

S7-200PPI

Item	Setting on PLC	V7 Comm. Parameter Setting
Baud rate	9600 bps	9600 bps
Port	2	2
Parity	Even (fixed)	–

S7-300/400MPI

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps (fixed)
Parity		–	Even (fixed)
Transmission code	Data length	–	8 (fixed)
	Stop bit	–	1 (fixed)
Local No. (PLC port number)		2	2

- Set [MPI Setting] in the [Communication Parameters] dialog of the V-SFT editor.

Item	MPI SETTING
Highest MPI Address	15/31/63/126
Source No. (V7 port number)	0

Highest MPI Address: Set the maximum value of the port numbers for the PLC or the V7 series.
Source No.: Set the V7-series port number.
Set different numbers for [Source No.] and [Local No.], and be sure that [Source No.] ≤ [Highest MPI Address].

[Highest MPI Address] setting example

If port numbers “13” and “20” are selected respectively for the PLC and the V7 series, select “31.”

S7-300MPI (V-MPI)

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps (fixed)
Parity		–	Even (fixed)
Transmission code	Data length	–	8 (fixed)
	Stop bit	–	1 (fixed)
Local No. (PLC port number)		2	2

* Set [MPI Setting] in the [Communication Parameters] dialog of the V-SFT editor. Refer to the above S7-300/400 MPI section for detail.

S7-300MPI (HMI ADP, PC ADP, Helmholz SSW7 ADP)

Item		Setting on PLC	V7 Comm. Parameter Setting	
			HMI ADP	PC ADP Helmholz SSW7 ADP
Baud rate		38400 bps	38400 bps (fixed)	38400 bps
Parity		–	Odd (fixed)	
Transmission code	Data length	–	8 (fixed)	
	Stop bit	–	1 (fixed)	
Local No. (PLC port number)		2	2	

* Set [MPI Setting] in the [Communication Parameters] dialog of the V-SFT editor. Refer to the above S7-300/400 MPI section for detail.

TI500/505, TI500/505 V4

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Parity		–	None (fixed)
Transmission code	Data length	–	8 (fixed)
	Stop bit	–	1 (fixed)

Available Memory

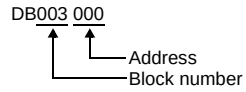
The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

S5, S5 V4, S7

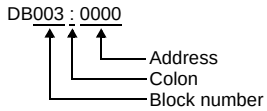
Memory		TYPE	Remarks
DB	(data register)	0	Use memory address DB1 and later for S7, or DB3 or later for S5.
I	(input relay)	1	IW as word device, read only
Q	(output relay)	2	QW as word device, read only
F	(flag/internal relay)	3	FW as word device, read only, only in S5 series
M	(flag/internal relay)	3	MW as word device, read only, only in S7 series
T	(timer/current value)	4	Read only
C	(counter/current value)	5	Read only
AS	(absolute address)	6	Unavailable with the S7 series

The assigned memory is indicated when editing the screen as shown below.

Example: For S5, S5 V4:



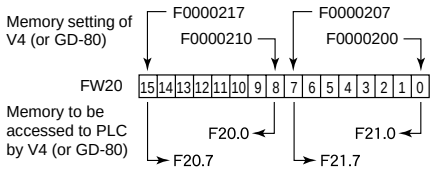
For S7:



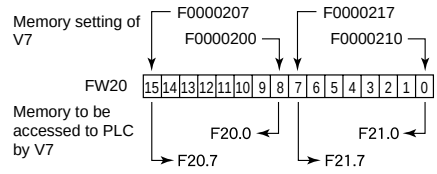
* Notes on V4 (or GD-80) data conversion

- When converting data of V4 (or GD-80) into the V7 data, [S5 V4] is automatically selected for the PLC type.
- With V4 (or GD-80), the order of bit strings of I (input relay), Q (output relay) and F (internal relay) is byte-reversed. Please take note of this.

Example: For S5 V4:



For S5, S7:

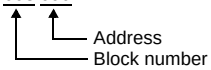


S5 PG Port

Memory		TYPE	Remarks
DB	(data register)	0	Use memory address DB3 and later.
I	(input relay)	1	IW as word device
Q	(output relay)	2	QW as word device
F	(flag/internal relay)	3	FW as word device
T	(timer/current value)	4	
C	(counter/current value)	5	
AS	(absolute address)	6	

The assigned memory is indicated when editing the screen as shown on the right.

Example: DB003 000



S7-200PPI

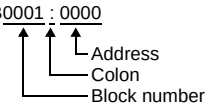
Memory		TYPE	Remarks
V	(data memory)	0	VW as word device
I	(input)	1	IW as word device Possible to write to the unused area
Q	(output)	2	QW as word device
M	(bit memory)	3	MW as word device
T	(timer/current value)	4	
C	(counter/current value)	5	
TB	(timer/contact)	6	Read only
CB	(counter/contact)	7	Read only
HC	(high-speed counter/contact)	8	Double-word usable
AIW	(analog input)	9	
AQW	(analog output)	10	
SM	(special memory/special relay)	11	SMW as word device
S	(stage)	12	SW as word device

S7-300/400MPI

Memory		TYPE	Remarks
DB	(Data Word)	0	Use memory address DB1 and later.
I	(input)	1	IW as word device
Q	(output)	2	QW as word device
M	(Marker Word)	3	MW as word device
T	(timer/current value)	4	
C	(counter/current value)	5	

The assigned memory is indicated when editing the screen as shown on the right.

Example: DB0001 : 0000

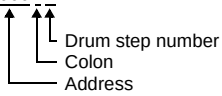


TI500/505 (TI500/505 V4)

Memory		TYPE	Remarks
V	(variable memory)	0	
WX	(word input)	1	
WY	(word output)	2	
X	(discrete input)	3	
Y	(discrete output)	4	
CR	(control relay)	5	
TCP	(timer, counter/set value)	6	
TCC	(timer, counter/current time)	7	
DCP	(drum count/set value)	8	*1
DCC	(drum count/current value)	9	Read only
DSP	(drum step/set value)	10	
DSC	(drum step/current value)	11	
K	(fixed memory)	12	
STW	(system state)	13	

*1 In case of using DCP (drum count/set value), set drum step No.1 to 16.
The assigned memory is indicated when editing the screen as shown on the right.

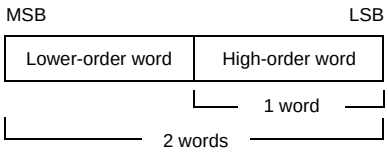
Example: DCP03000 : 1



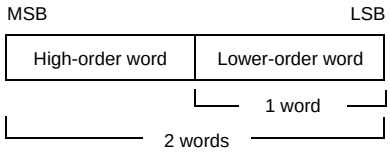
* Notes on V4 (or GD-80) data conversion

- When converting data of V4 (or GD-80) into the V7 data, [TI500/505 V4] is automatically selected for the PLC type.
- With V4 (or GD-80), the order of words is reversed in the case of double-words. Please take note of this.

For V4 (or GD-80):



For V7:

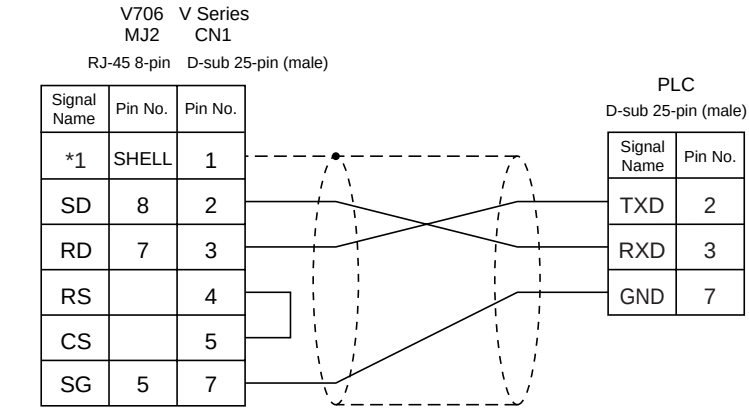


Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

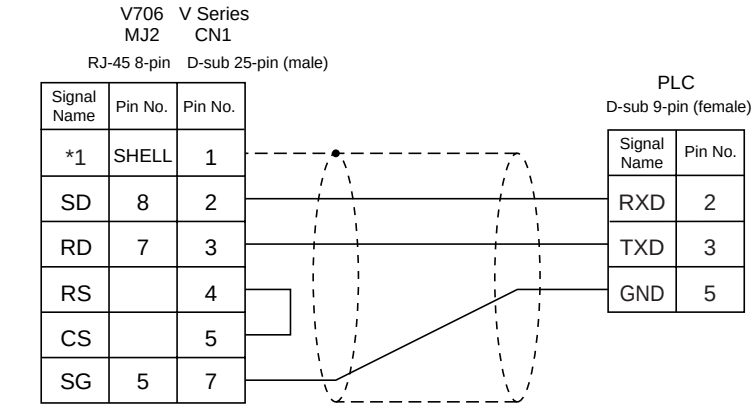
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

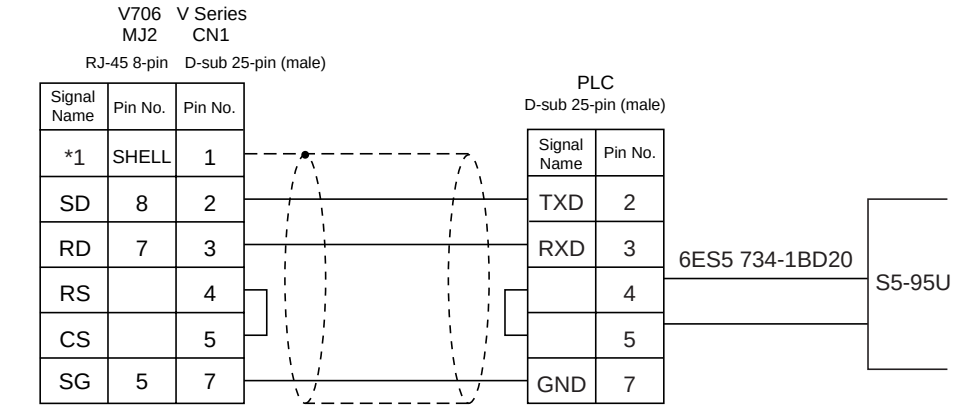
Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

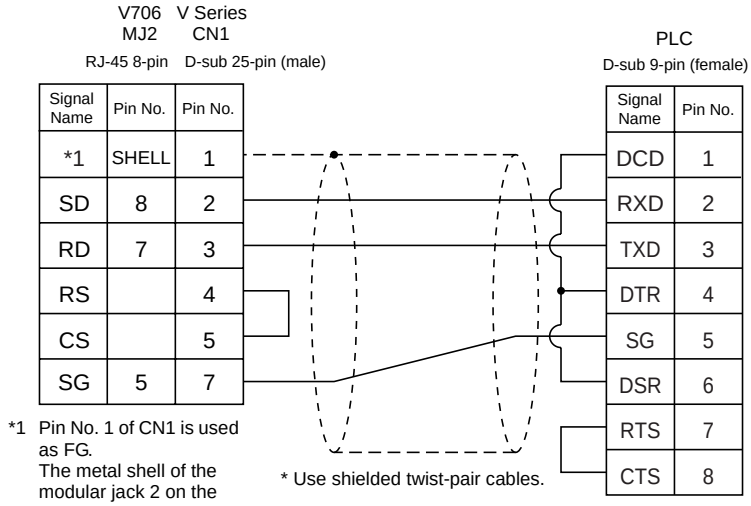
Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

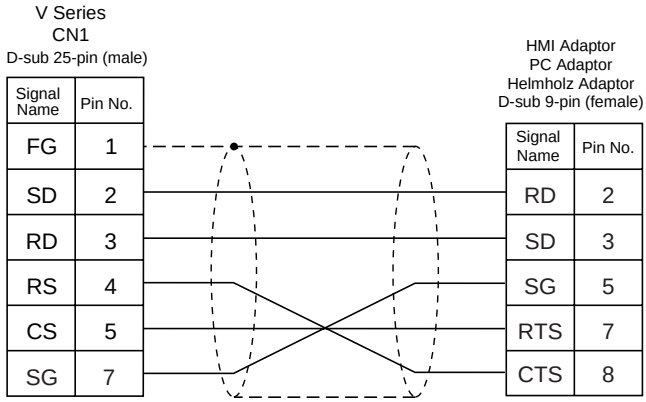
Wiring Diagram 4



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

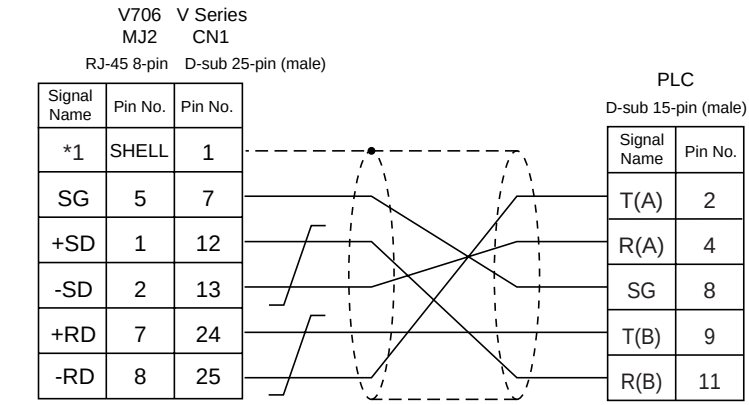
Wiring Diagram 5



* Use shielded twist-pair cables.

RS-422

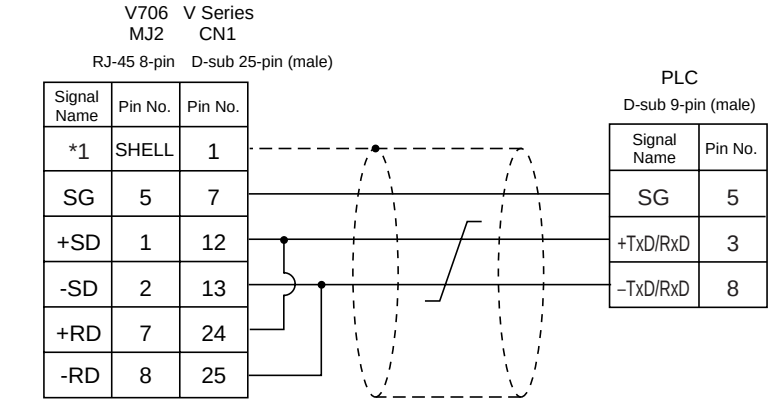
Wiring Diagram 6



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 7

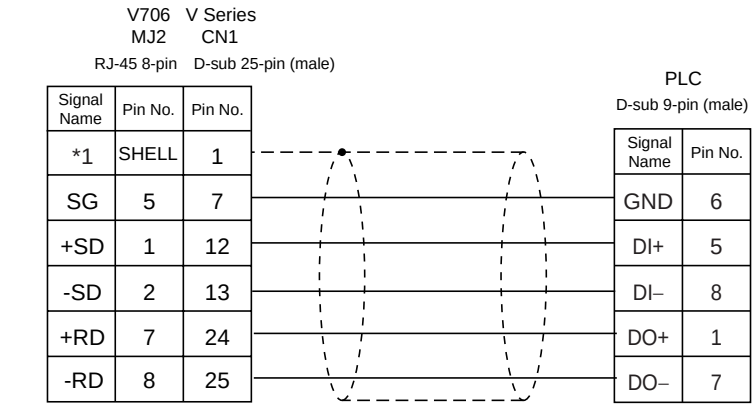


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Refer to “Terminating Resistance Setting” (page 24-11) to connect terminating resistance.

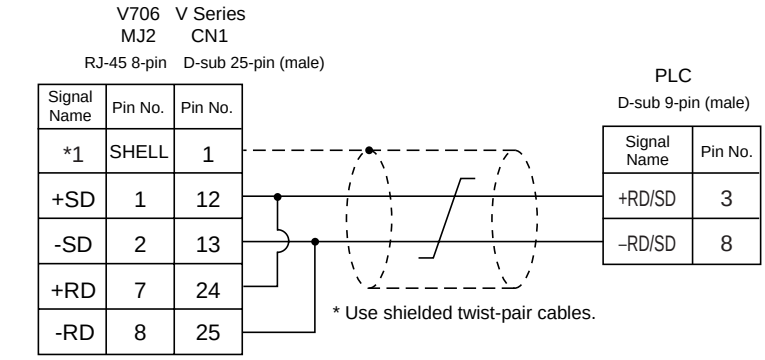
Wiring Diagram 8



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 9

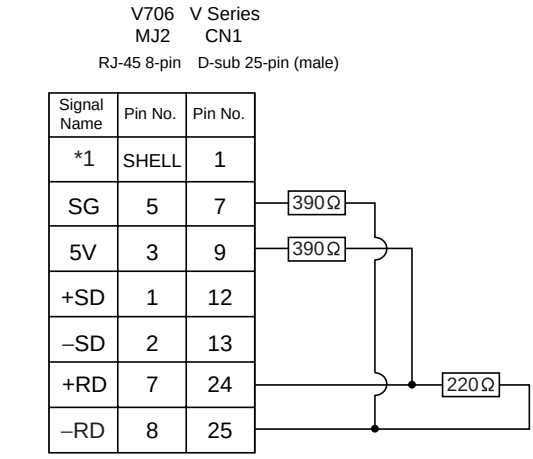


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

Refer to “Terminating Resistance Setting” (page 24-11) to connect terminating resistance.

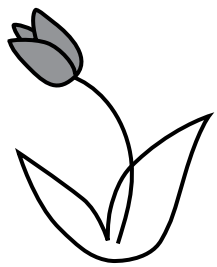
Terminating Resistance Setting

Set the DIP switch 7 of the V series (for V706: No. 3) to the OFF position.
Connect terminating resistance to the serial connector of the V series as shown below.
If the terminating resistance is not connected, a communication error may occur.



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

MEMO



Please use this page freely.

25. TAIAN PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
TP02	TP02	Communication Port (T/R+, T/R–)	RS-422 [Wiring Diagram 1]	×	×
		MMI Port (9-pin) (4-5 Short Computer Link Mode)	RS-422 [Wiring Diagram 2]		

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		1	1
Parity		Not provided	Not provided
Transmission code	Data length	7	7
	Stop bit	1	1

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

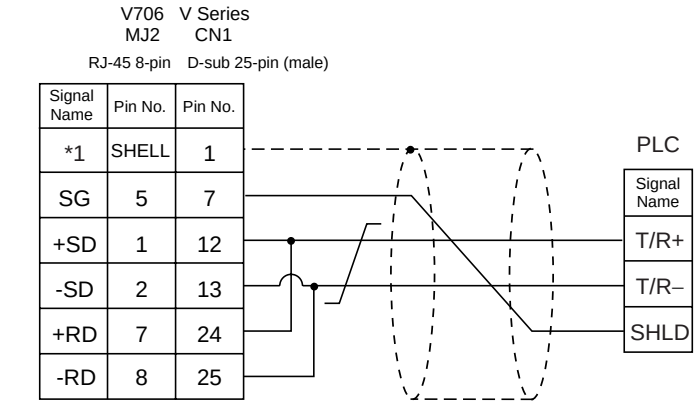
Memory		TYPE	Remarks
D	(data register timer•counter/contact)	0	
V	(timer•counter/contact)	1	
WS	(system register)	2	
WC	(constant register)	3	
X	(input relay)	4	
Y	(output relay)	5	
C	(internal relay)	6	
SC	(special register)	7	

Wiring

Wiring diagrams with the PLC are shown below.

RS-422

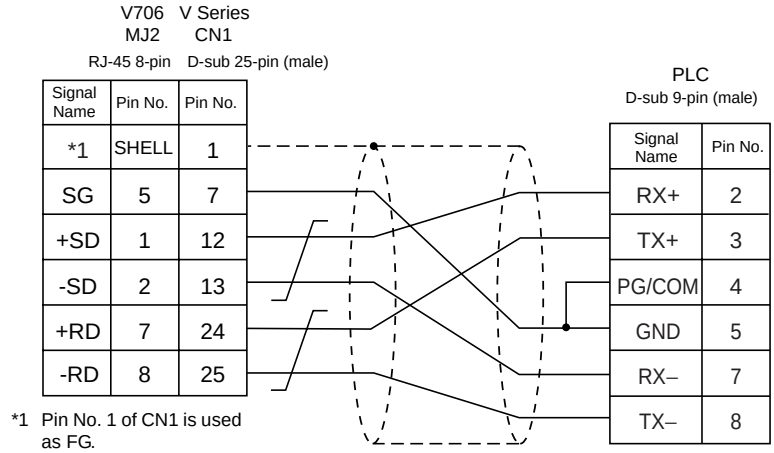
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

26. Telemecanique PLC

Available PLCs

Select PLC Type	PLC	Connection	PLC2Way	Ladder Transfer
TSX Micro	TSX Micro	RS-485 [Wiring Diagram 1]	×	×

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Connection		–	Multi-Link (fixed)
Parity		Odd	Odd
Transmission code	Data length	8 (fixed)	8
	Stop bit	1	1

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

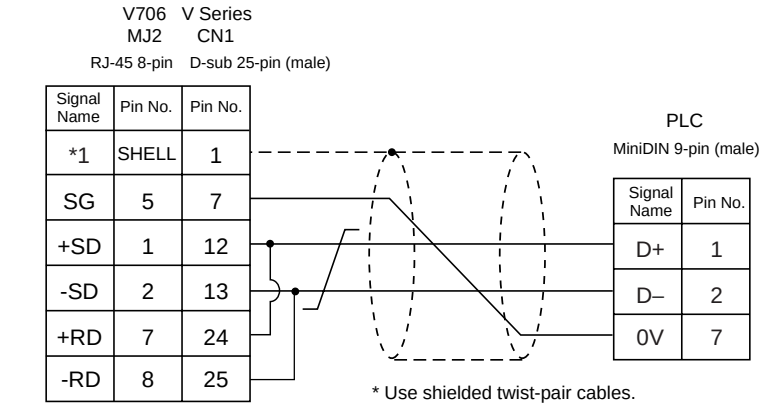
Memory		TYPE	Remarks
MW	(memory word)	0	
KW	(constant word)	1	
M	(bit memory)	2	

Wiring

Wiring diagram with the PLC is shown below.

RS-485

Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

27. TOSHIBA PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
T series	T series	Computer link port on CPU	RS-422 [Wiring Diagram 1]	×	×
EX series	EX100, 250, 500	Computer link port on CPU	RS-422 [Wiring Diagram 2]		

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

T Series

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		01	1
Parity		Odd	Odd
Transmission code	Data length	8	8
	Stop bit	1	1

- PLC Transmission Parameter Setting
  When setting parameters on the PLC, use the T series programmer and enter the following data for system information “7. COMPUTER LINK.”

Station number	1
Baud rate	19200 bps
Parity	Odd
Data length	8 bits
Stop bit	1 bit

EX Series

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Port		01	1
Parity		Odd	Odd
Transmission code	Data length	8	8
	Stop bit	1	1
Communication selector switch		LINK: computer link	–

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

T Series

Memory		TYPE	Remarks
D	(data register)	0	
X	(input)	1	XW as word device
Y	(output)	2	YW as word device
R	(auxiliary relay)	5	RW as word device
L	(link relay)	6	LW as word device
W	(link register)	7	
F	(file register)	8	
TN	(timer/current value)	9	Read only
CN	(counter/current value)	10	Read only
TS	(timer/contact)	11	Read only
CS	(counter/contact)	12	Read only

EX Series

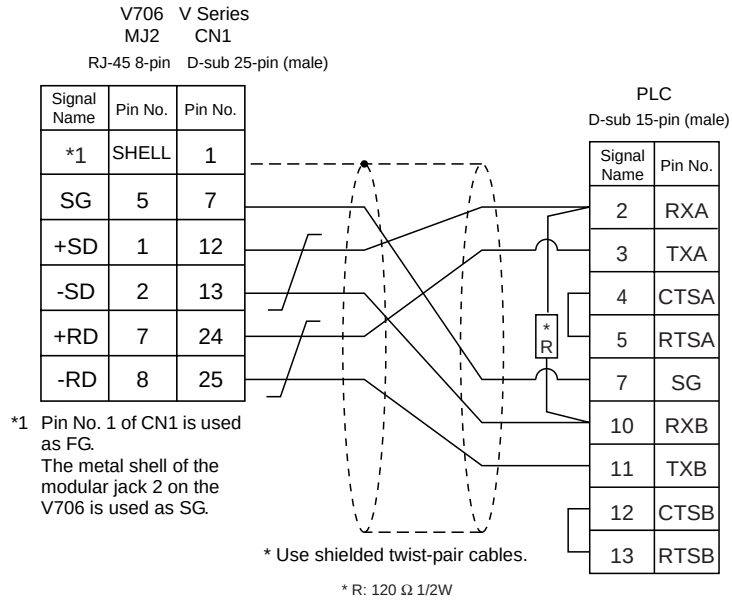
Memory		TYPE	Remarks
D	(data register)	0	
X	(input)	1	XW as word device
Y	(output)	2	YW as word device
R	(auxiliary relay)	3	RW as word device
Z	(link relay)	4	SW as word device
TN	(timer/current value)	5	Read only
CN	(counter/current value)	6	Read only

Wiring

Wiring diagrams with the PLC are shown below.

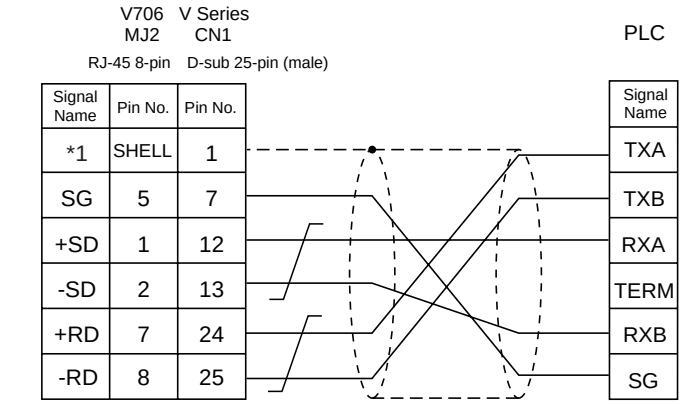
RS-422

Wiring Diagram 1



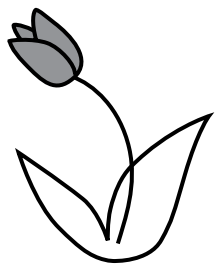
*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

MEMO



Please use this page freely.

28. TOSHIBA MACHINE PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
TC200	TC200	Port on the CPU unit	RS-232C [Wiring Diagram 1]	×	×
		TCCMW TCCMO			
	TCmini	–			

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Port		1	1
Parity		Not provided	None (fixed)
Transmission code	Data length	8	8 (fixed)
	Stop bit	2	2

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

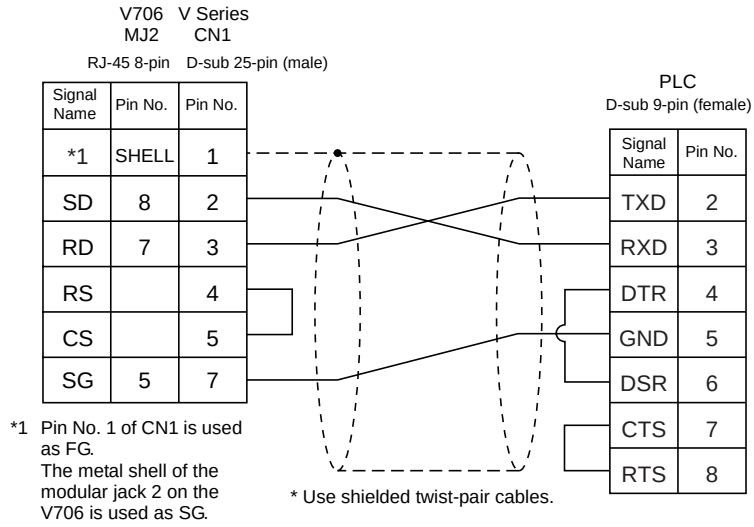
Memory		TYPE	Remarks
D	(register 1)	0	
B	(register 2)	1	
X	(input relay)	2	XW as word device
Y	(output relay)	3	YW as word device
R	(temporary storage)	4	RW as word device
G	(extension temporary storage 1)	5	GW as word device
H	(extension temporary storage 2)	6	HW as word device
L	(latch relay)	7	LW as word device
S	(shift register)	8	SW as word device
E	(edge relay)	9	EW as word device
P	(timer counter current value)	10	
V	(timer counter set value)	11	
T	(timer)	12	TW as word device
C	(counter)	13	CW as word device
A	(special auxiliary relay)	14	AW as word device

Wiring

Wiring diagram with the PLC is shown below.

RS-232C

Wiring Diagram 1



29. Toyoda Machine Works PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
TOYOPUC	L2/PC2 series PC3J	CMP-LINK	RS-422 [Wiring Diagram 1]	○	×

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		0	0
Parity		Even	Even
Transmission code	Data length	7 (ASCII)	7
	Stop bit	2	2

Set [Trans. Mode] in the [Detail] tab window of the [Comm. Parameter] dialog of the V-SFT editor.

- PC3J: Select [Single Data Area] or [Split Data Area].
- L2/PC2 series: Select [Single Data Area].

Transmission Mode	Contents
Single Data Area	Data area is common.
Split Data Area	Each PLC device is divided into program files.

Switch Setting

Baud rate: 19200 bps

Switch	Setting	Contents
SW1	0	Station address (lower half)
SW2	0	Station address (upper half)
SW3	1	Baud rate 1: 19200 2: 9600 3: 4800 4: 2400 5: 1200 6: 600

Switch	Short Bar	Contents
SET2	Provided	Data length: 7 bits
SET3	Provided	Stop bit: 2 bits

Available Memory

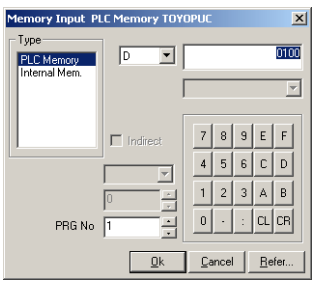
The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

Memory		TYPE	Remarks
D	(data register)	0	
R	(link register)	1	
B	(file register)	2	
N	(current value register)	3	
X	(input relay)	4	WX as word device
Y	(output relay)	5	WY as word device
M	(internal relay)	6	WM as word device
K	(keep relay)	7	WK as word device
L	(link relay)	8	WL as word device
T	(timer/contact)	9	WT as word device
C	(counter/contact)	10	WC as word device
U	(extensional data register)	11	
H	(extensional set value register)	12	
EN	(extensional current value register)	13	
EX	(extensional input relay)	14	WEX as word device
EY	(extensional output relay)	15	WEY as word device
EM	(extensional internal relay)	16	WEM as word device
EK	(extensional keep relay)	17	WEK as word device
EL	(extensional link relay)	18	WEL as word device
ET	(extensional timer/contact)	19	WET as word device
EC	(extensional counter/contact)	20	WEC as word device
V	(special register)	21	WV as word device

Screen Editing (Memory Input)

When [Split Data Area] is selected for [Trans. Mode], the [PRG No] setting is available in the [Memory Input] dialog.

- Range for [PRG No.]: 1 to 3

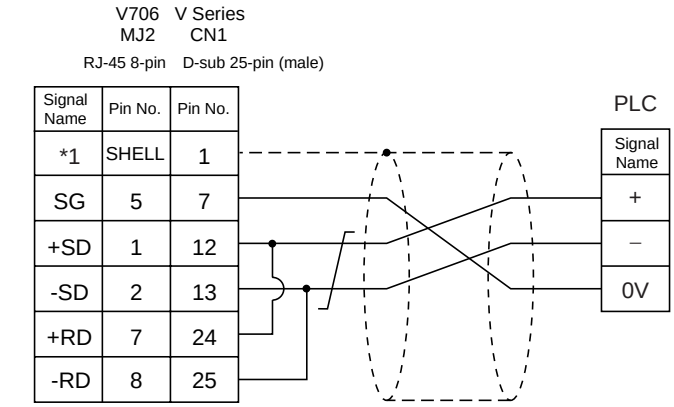


Wiring

Wiring diagram with the PLC is shown below.

RS-422

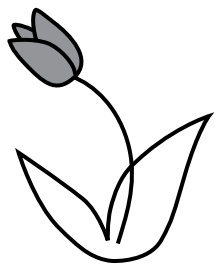
Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

MEMO



Please use this page freely.

30. VIGOR PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
M series	M1-CPU1	COM PORT	RS-232C [Wiring Diagram 1] RS-485 [Wiring Diagram 2]	×	×

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		0	0
Parity		Even	Even
Transmission code	Data length	7	7
	Stop bit	1	1

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

Memory		TYPE	Remarks
D	(data register/special register)	0	
X	(input relay)	1	
Y	(output relay)	2	
M	(internal relay/special relay)	3	
S	(internal relay/step relay)	4	
T	(timer/current value)	5	
C	(counter/current value)	6	
32C	(high-speed counter/current value)	7	*1
TS	(timer/contact)	8	
CS	(counter/contact)	9	
TC	(timer/coil)	10	
CC	(counter/coil)	11	

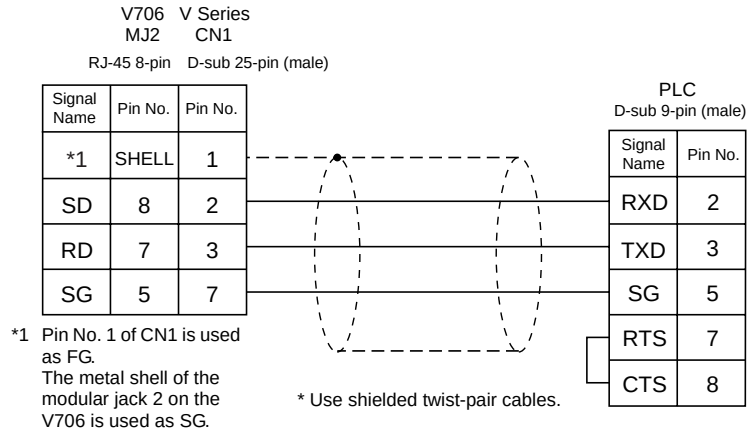
*1 For numerical data format where double-words can be used (Num. Data Display, Graph, Sampling), data is processed as double-words. For those where bits or words can be used, data is processed as words consisting of lower 16 bits.
For input Upper 16 bits are ignored.
For output “0” is written for upper 16 bits.

Wiring

Wiring diagrams with the PLC are shown below.

RS-232C

Wiring Diagram 1

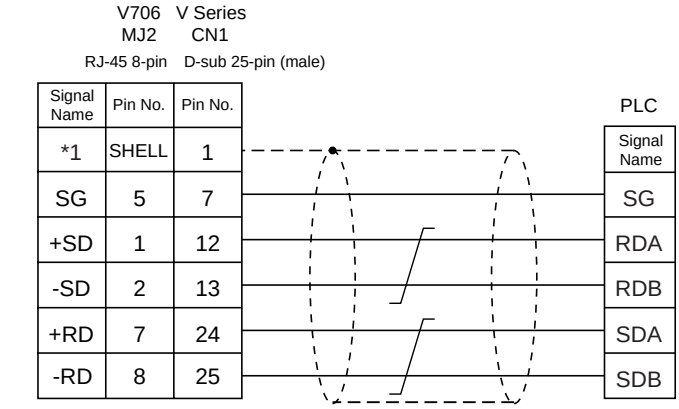


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-485

Wiring Diagram 2



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

31. Yamatake PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
MX series	MX200/MX50	ASCII connector	RS-232C [Wiring Diagram 1]	×	×

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		9600 bps	9600 bps
Port		1	1
Parity		Even	Even
Transmission code	Data length	8	8
	Stop bit	1	1

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

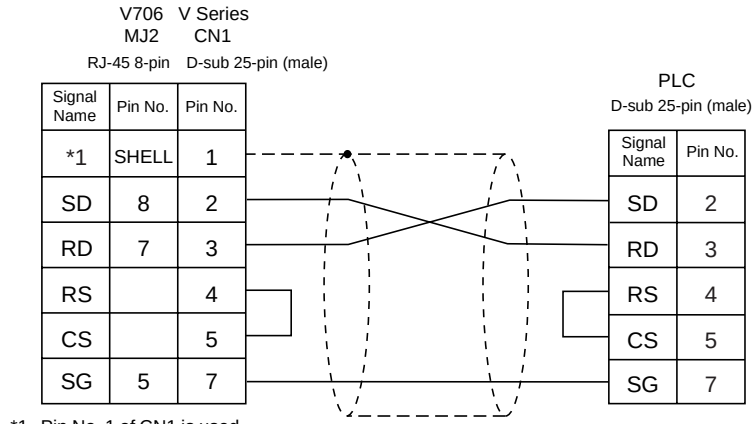
Memory		TYPE	Remarks
R	(data register)	0	
M	(auxiliary relay)	1	
L	(latch relay)	2	
X	(input relay)	3	
Y	(output relay)	4	
TP	(timer/current value)	5	
TS	(timer/setting value)	6	
CP	(counter/current value)	7	
CS	(counter/setting value)	8	
T	(timer/contact)	9	
C	(counter/contact)	10	
P	(link register)	11	

Wiring

Wiring diagram with the PLC is shown below.

RS-232C

Wiring Diagram 1



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

32. Yaskawa Electric PLC

Available PLCs

Select PLC Type	PLC	Unit/Port	Connection	PLC2Way	Ladder Transfer
Memobus	GL60 series	JAMSC-IF60 JAMSC-IF61 JAMSC-IF611	RS-232C [Wiring Diagram 1]	×	×
		JAMSC-IF612 JAMSC-IF613	RS-422 [Wiring Diagram 6]		
	GL120 GL130 series	Memobus port on the CPU module	RS-232C [Wiring Diagram 1]		
		JAMSC-120NOM27100	RS-422 [Wiring Diagram 7]		
	PROGIC-8	PORT2 on the CPU unit	RS-232C [Wiring Diagram 2]		
CP9200SH/MP900	CP9200SH	CP-217IF	RS-232C [Wiring Diagram 3] [Wiring Diagram 4]		
			RS-422 [Wiring Diagram 8]		
	MP920 MP930	Memobus port on the CPU module	RS-232C [Wiring Diagram 1]		
		217IF	RS-232C [Wiring Diagram 3] RS-422 [Wiring Diagram 9]		
	MP2200 MP2300	217IF-01 218IF-01	RS-232C [Wiring Diagram 5] RS-422 [Wiring Diagram 10]		

* Other PLCs can also be connected with Memobus.

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

Memobus

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		1	1
Parity		Even	Even
Transmission code	Data length	8-bit RTU (fixed)	–
	Stop bit	1	1
Error check		CRC (fixed)	–
Port delay timer		0 (fixed)	–

Select [TYPE 1] or [TYPE 2] for [Trans. Mode] in the [Comm. Parameter] dialog of the V-SFT editor.

PLC Model	V7 Setting	Contents
GL60 series, PROGIC-8	TYPE 1	Special binary code
GL120/130 series	TYPE 2	Standard binary code

CP9200SH/MP900

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		1	1
Parity		Even	Even
Transmission code	Data length	8	8
	Stop bit	1	1
Error check		CRC (fixed)	–
Port delay timer		0 (fixed)	–

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

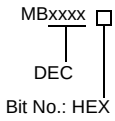
Memobus

Memory		TYPE	Remarks
4	(word device)	0	
3	(input register)	1	Including constant register, read only
R	(link register)	2	
A	(extension register)	3	
0	(coil)	4	
D	(link coil)	5	
1	(input relay)	6	Read only
7	(constant register)	7	

CP9200SH/MP900

Memory		TYPE	Remarks
MW	(holding register)	0	MB as bit device
IW	(input register)	1	IB as bit device, read only
MB	(coil)	4	MW as word device
IB	(input relay)	6	IW as word device, read only

When setting the MB/IB memory, set the bit numbers in the hexadecimal notation.

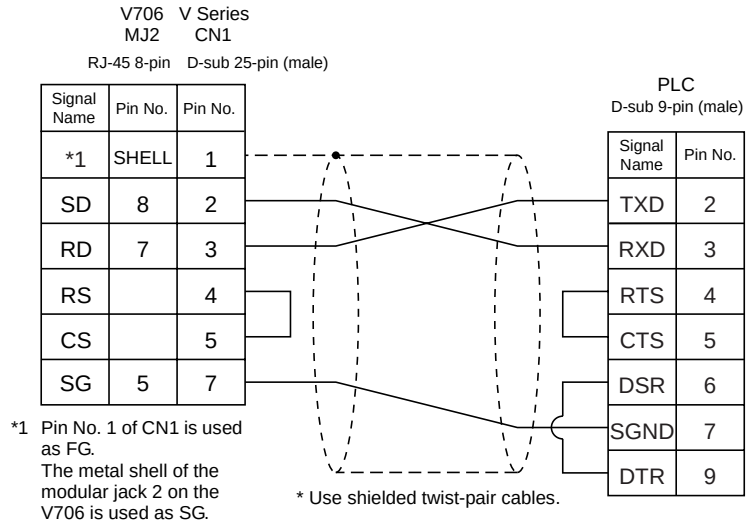


Wiring

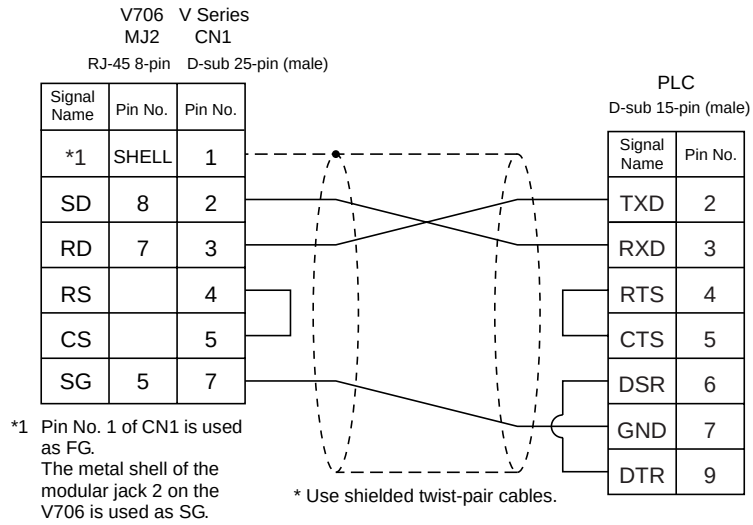
Wiring diagrams with the PLC are shown below.

RS-232C

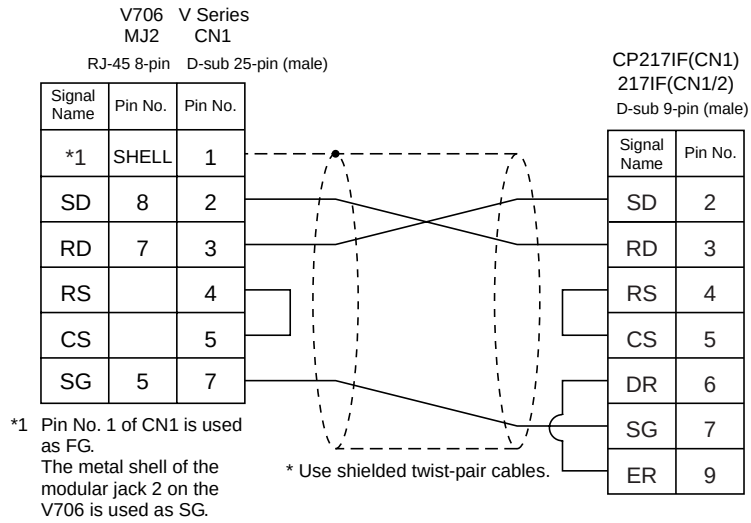
Wiring Diagram 1



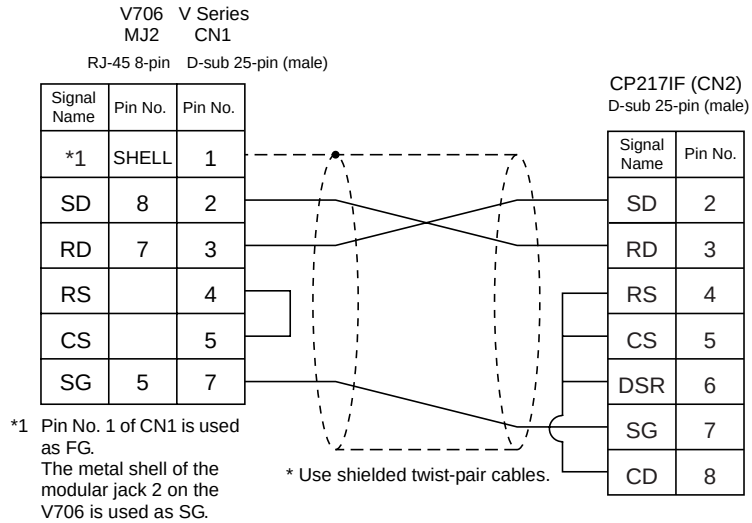
Wiring Diagram 2



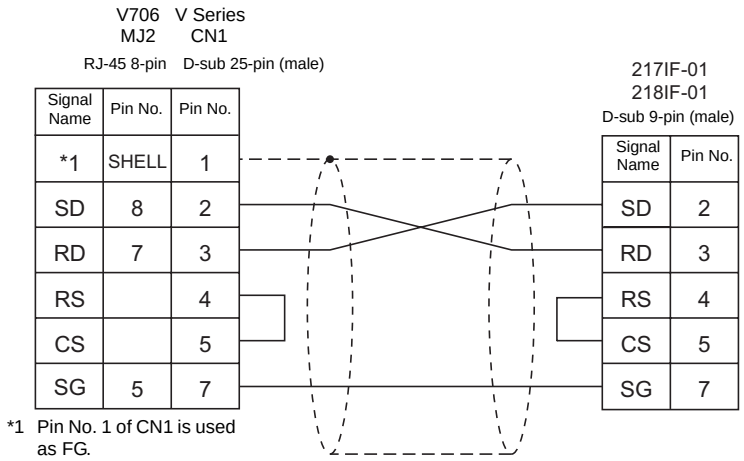
Wiring Diagram 3



Wiring Diagram 4



Wiring Diagram 5

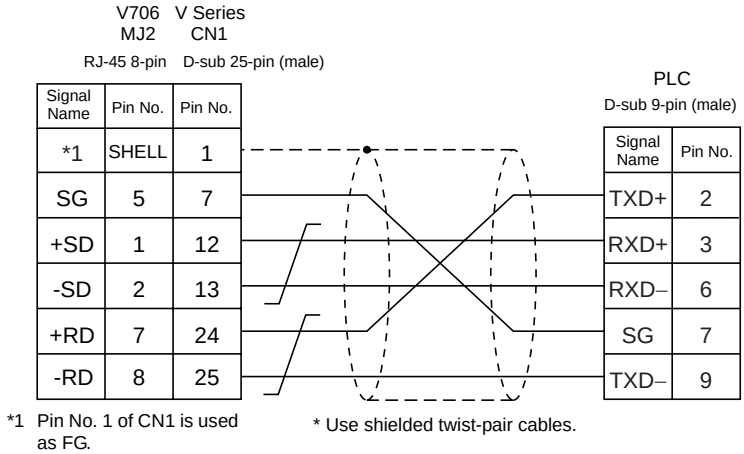


*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

RS-422

Wiring Diagram 6



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 7

V706 MJ2 RJ-45 8-pin

Signal Name	Pin No.
*1	SHELL
SG	5
+SD	1
-SD	2
+RD	7
-RD	8

V Series CN1 D-sub 25-pin (male)

Pin No.
1
7
12
13
24
25

PLC D-sub 9-pin (male)

Signal Name	Pin No.
TXD+	2
RXD+	3
RXDRT	4
RXD–	6
SG	7
TXRD	8
TXD–	9

*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

Wiring Diagram 8

V706 MJ2 RJ-45 8-pin

Signal Name	Pin No.
*1	SHELL
+SD	1
-SD	2
+RD	7
-RD	8

V Series CN1 D-sub 25-pin (male)

Pin No.
1
12
13
24
25

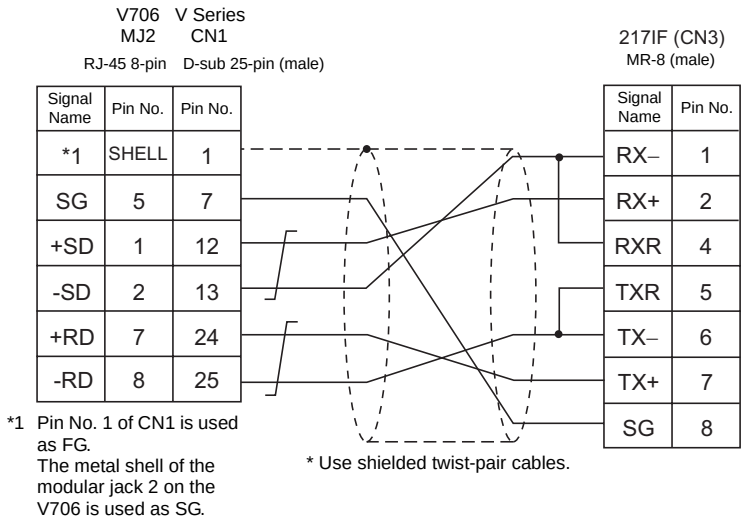
CP217IF (CN3) MR-8 (male)

Signal Name	Pin No.
RX–	1
RX+	2
TX–	6
TX+	7

*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

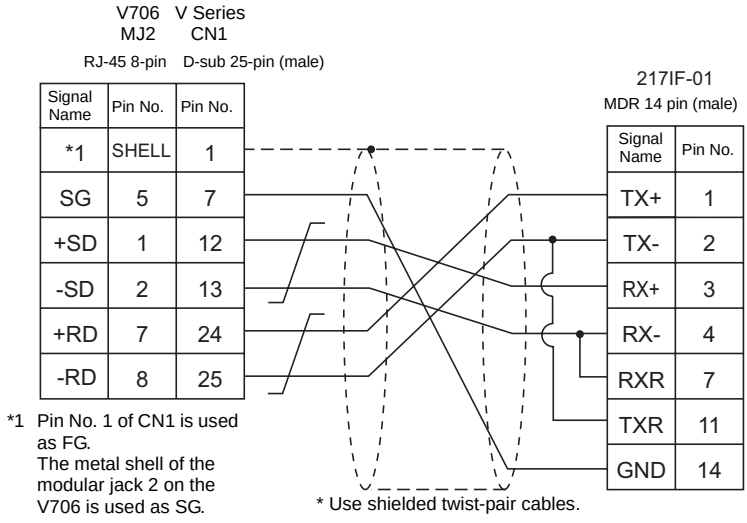
Wiring Diagram 9



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

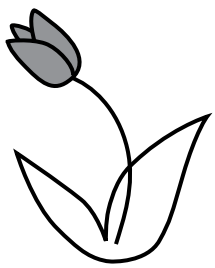
Wiring Diagram 10



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

MEMO



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33. Yokogawa Electric PLC

Available PLCs

Select PLC Type	CPU	Unit/Port	Connection	PLC2Way	Ladder Transfer*4
FA500	FA500	LC01-0N	RS-232C [Wiring Diagram 1]	×	×
		LC02-0N	RS-232C [Wiring Diagram 1]	×	
			RS-422 [Wiring Diagram 3]	×	
FA-M3	FA-M3	Programming tool port on the CPU module*1	Yokogawa's ladder transfer cable "KM11-2N"*2	○	○
		F3LC01-1N*3	RS-232C [Wiring Diagram 2]	○	×
		F3LC11-1N			
		F3LC11-2N	RS-422 [Wiring Diagram 3]	○	
FA-M3R	FA-M3 R	Programming tool port on the CPU module*1	Yokogawa's ladder transfer cable "KM11-2N"*2	○	○
		F3SP66-4S F3SP67-4S	Yokogawa's cable "KM21-2N"*2		×
		F3LC12-1F	RS-232C [Wiring Diagram 2]		×

*1 The CPUs that can be connected directly to the programming tool port on the CPU module are "F3SP21-0N," "F3SP25-2N," "F3SP35-5N," "F3SP28-3N," "F3SP38-6N," "F3SP53-4H" and "F3SP58-6H."
*2 For connection to MJ2 of a V706, use an MJ2-PLC adaptor plus KM11-2N or an MJ2-PLC adaptor plus KM21-2N .
*3 When the link unit "F3LC01-1N" is used, the communication setting and available memory are the same as those for "FA-500." However, B (common register) cannot be used.
*4 For the ladder transfer function, refer to "Appendix 8 Ladder Transfer Function."

Communication Setting

The recommended communication parameter settings of the PLC and the V7 series are as follows:

FA500

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		1	1
Parity		Even	Even
Transmission code	Data length	7	7
	Stop bit	1	1
Sumcheck		Provided (fixed)	–
Terminal character		None (fixed)	–
Protection function		None (fixed)	–

FA-M3/FA-M3R

Item		Setting on PLC	V7 Comm. Parameter Setting
Baud rate		19200 bps	19200 bps
Port		1	1
Parity		Even	Even
Transmission code	Data length*	7	7
	Stop bit	1	1
Sumcheck		Provided	Provided
Terminal character		None (fixed)	–
Protection function		None (fixed)	–

* When directing connecting to the programming tool port on the CPU module, the data length is fixed to “8.”
Select [8-bit] for [Data Length] in the [Comm. Parameter] dialog of the V7 series.
Also, set “CPU Communication Port” of “Configuration” in the ladder creation tool as below.
Personal computer link function: Use

* The maximum baud rate available with the V7 series is 115200 bps.
Select the appropriate baud rate depending on the used PLC and environment.

Available Memory

The available memory setting range varies depending on the PLC model. Be sure to set within the range available with the PLC to be used. Use [TYPE] when assigning the indirect memory for macro programs.

FA500

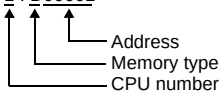
Memory		TYPE	Remarks
D	(data register)	0	
B	(common register)	1	
TP	(timer/current value)	2	
TS	(timer/set value)	3	
CP	(counter/current value)	4	
CS	(counter/set value)	5	
X	(input relay)	6	
Y	(output relay)	7	
I	(internal relay)	8	
E	(external relay)	9	

FA-M3/FA-M3R

Memory		TYPE	Remarks
D	(data register)	0	
R	(common register)	1	
V	(index register)	2	
W	(link register)	3	
Z	(special register)	4	
TP	(down timer current value)	5	
TS	(timer set value)	6	Read only
CP	(down counter current value)	7	
CS	(down counter set value)	8	
X	(input relay)	9	
Y	(output relay)	10	
I	(internal relay)	11	
E	(common relay)	12	
L	(link relay)	13	
M	(special relay)	14	
B	(file register)	15	

* The CPU number is required in addition to the memory type and address. The assigned memory is indicated when editing the screen as shown on the right.

Example: 1 : D00001

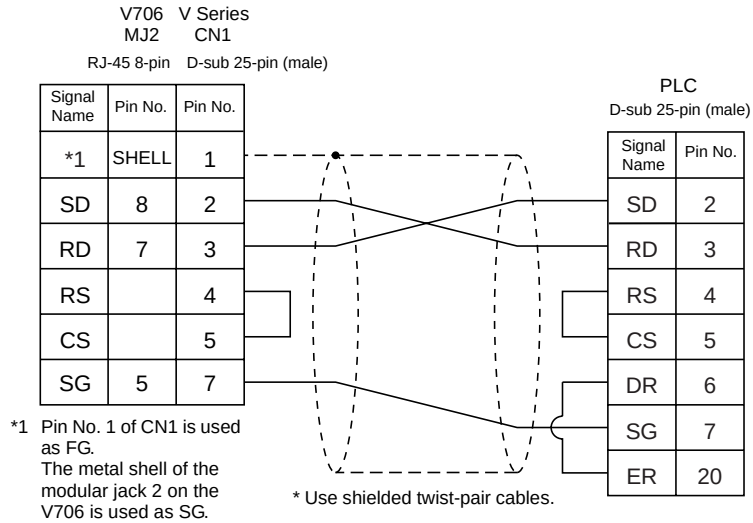


Wiring

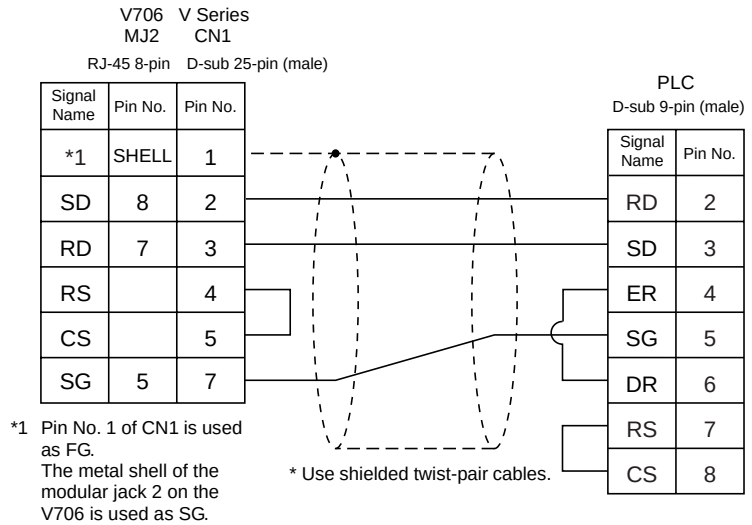
Wiring diagrams with the PLC are shown below.

RS-232C

Wiring Diagram 1

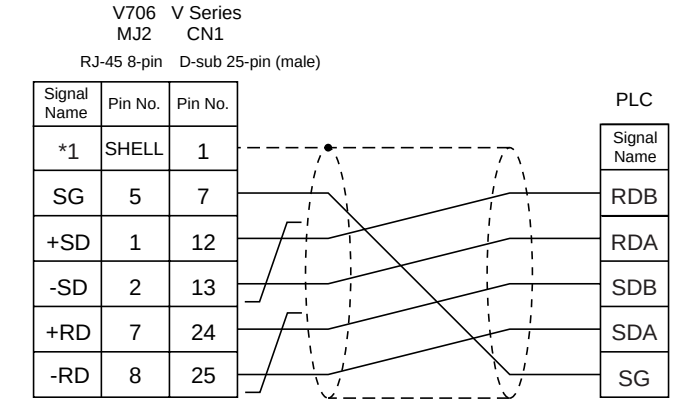


Wiring Diagram 2



RS-422

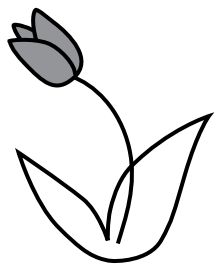
Wiring Diagram 3



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

* Use shielded twist-pair cables.

MEMO



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Appendix

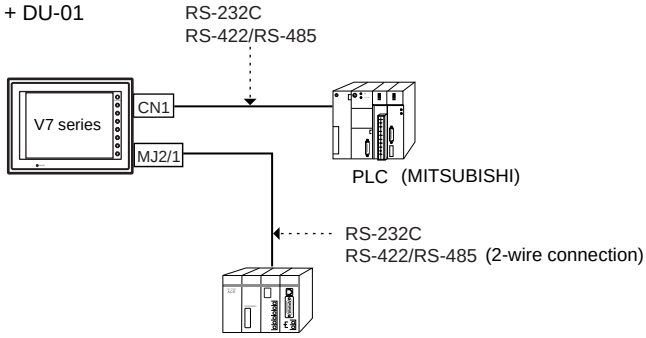
Appendix 1	PLC2Way
Appendix 2	n : 1 Connection (Multi-link 2)
Appendix 3	n : 1 Connection (Multi-link)
Appendix 4	1 : n Connection (Multi-drop)
Appendix 5	Ethernet
Appendix 6	Universal Serial Communications
Appendix 7	V-Link
Appendix 8	Ladder Transfer Function

Appendix 1 PLC2Way

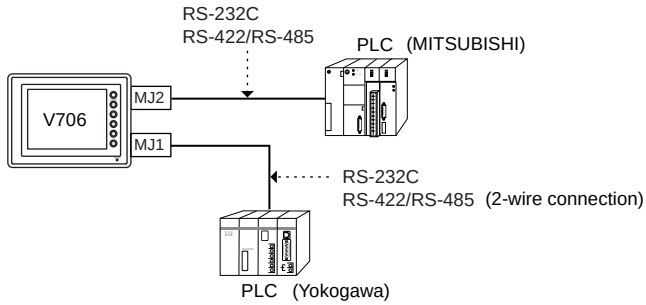
PLC2Way

- The “PLC2Way” function is an original network function where one V7 series can be connected to two PLCs. Even if the manufacturers of these PLCs are not the same, they can be connected to one V7 series.
- When the V7 series or a V706 equipped with DU-01 is used, connect the first PLC to the CN1 connector. When a V706 is used, connect the first PLC to MJ2. Connect the second PLC to the MJ port (to MJ1 when a V706 is used).

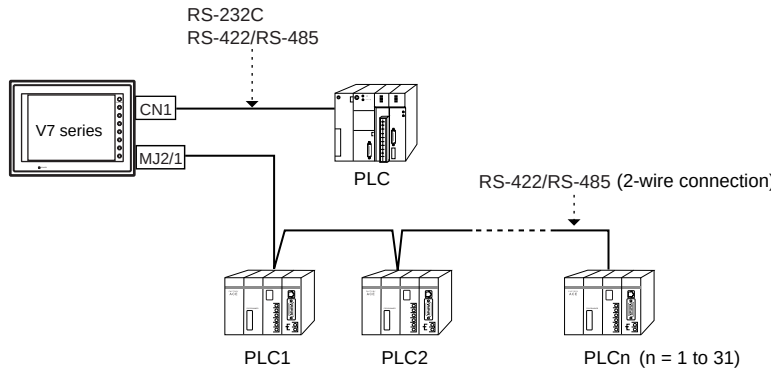
V7 series or V706 + DU-01



V706



- With the PLC2Way function, it is possible to communicate with PLCs without special program in the same way as 1 : 1 connection.
  Two PLCs that are connected to the V7 series are controlled at the same time, and memory read/write operations are available with these two PLCs.
- When the PLC2Way function is used, connection at the MJ port is possible via RS-232C or RS-485 (2-wire connection).
  With RS-232C, one PLC can be connected; with RS-485, a maximum of 31 PLCs can be connected.



- Constant reading/sampling of PLC data connected to the PLC2Way
  When read/write memory addresses are preset on the temperature control network/PLC2Way table, background data transfering is performed at regular intervals. It is also possible to save the read data in the V7 internal buffer, SRAM or CF card.
- Data transfer between PLCs
  The PLC memory data can be transferred to another PLC in blocks using a macro command.

For the description of 1 : 1 connection, refer to “Chapter 1.”
Hereunder the PLC connection at the MJ port and settings required for PLC2Way connection are described.

Limitations on Connection at PLC2Way

There are some limitations on the connection at the MJ port.

1. It is not possible to make a selection for text processing in the communication parameter setting.
   Text processing: Fixed to [LSB → MSB].
2. Even if a communication error occurs, it is not possible to stop communications.
   Error codes are stored in $s730 to 761 for each station.
3. For V7 series, connections using both the PLC2Way and multi-link 2 functions are possible at the same time when the system program is version 1.010 or later and the V-SFT editor is version 2.0.2.0 or later.

PLCs Compatible with PLC2Way Connection at MJ Port

- When connecting the V7 series to the PLC at the MJ port using PLC2Way function, use the RS-232C or RS-485 (RS-422) 2-wire connection. The PLC that allows RS-485 (RS-422) (4-wire) connection only cannot be connected directly.
- PLCs compatible with PLC2Way connection at MJ port as of October, 2006 are shown below.

Manufacturer	Applicable PLCs	See:
Allen-Bradley	For the applicable PLCs, refer to “PLC2Way” under “Available PLCs” in “Chapter 2” to “Chapter 33.” (○: Connectable ×: Not connectable)	page 2-1
Fuji Electric		page 8-1
Hitachi		page 10-1
KEYENCE		page 12-1
Matsushita Electric Works		page 15-1
MITSUBISHI ELECTRIC		page 16-1
OMRON		page 19-1
SHARP		page 22-1
Toyoda Machine Works		page 29-1
Yokogawa Electric		page 33-1

For the applicable PLCs, refer to “PLC2Way” under “Available PLCs” in “Chapter 2” to “Chapter 33.” (○: Connectable ×: Not connectable)

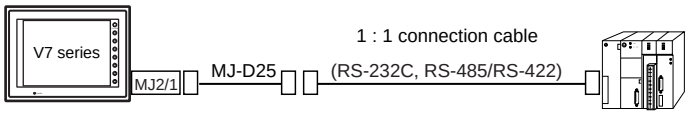
- The communication parameter setting and available memory for the PLC connected at the MJ port for PLC2Way connection are the same as those for 1 : 1 connection. Refer to the communication setting and the available memory for each manufacturer in “Chapter 2” to “Chapter 33.”

Wiring

Two kinds of cables are available for PLC2Way connection at the MJ port. Cable connections are explained.

Connecting Method 1 (Using MJ-D25)

- To connect the PLC and the V7 series at the MJ port, use Hakko Electronics' MJ to D-sub conversion cable "MJ-D25" (0.3 m, metric thread) and the cable for 1 : 1 connection at CN1.
  For more information on the cable for 1 : 1 connection at CN1, refer to "Wiring" in "Chapter 2" to "Chapter 33."
- This combination of cables (MJ-D25 + 1 : 1 connection cable) can be used either for RS-232C or RS-485 (RS-422) 2-wire connection.



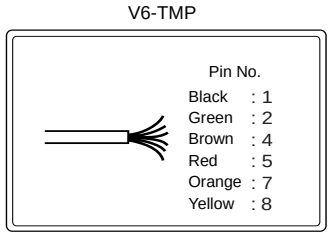
- With RS-485 (2-wire connection), a maximum of 31 PLCs can be connected.
  For information on connection between PLCs, refer to the instruction manual for the PLC.

Connecting Method 2 (Using V6-TMP)

- Use Hakko Electronics' cable "V6-TMP" (3 m) when connecting the V7 series to a PLC at the MJ port.

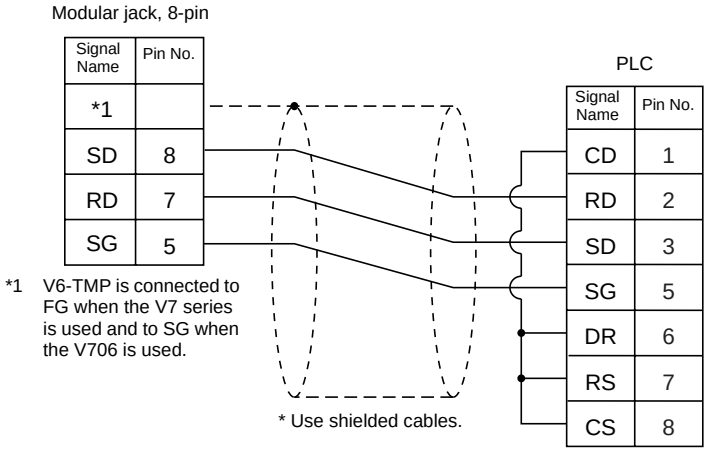
  The shielded cable of V6-TMP is connected to FG (frame ground) when the V7 series is used and to SG (signal ground) when the V706 is used.

* Notes on Use of V6-TMP
There are six wires in the V6-TMP cable as shown on the right.
The wires to be used are determined depending on the connecting method.
For the wires not used, be sure to properly insulate with tape, etc.



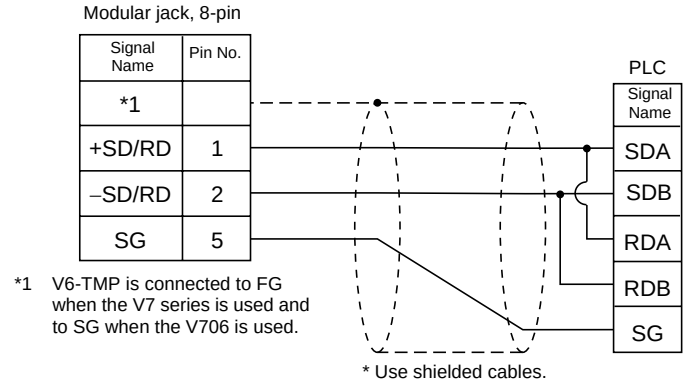
<RS-232C Connection>

- Connection example with MITSUBISHI A1SJ71UC24-R2

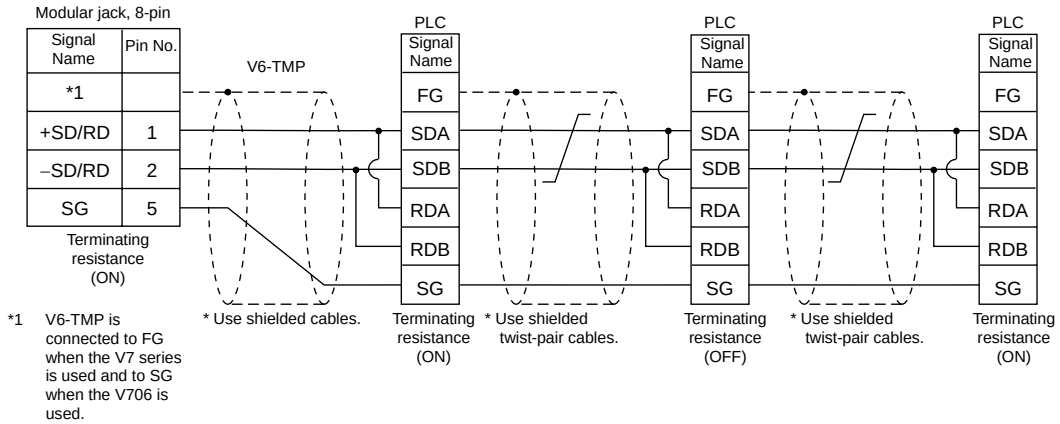


<RS-485 Connection>

- Connection example with Mitsubishi A1SJ71UC24-R4 (1 set)



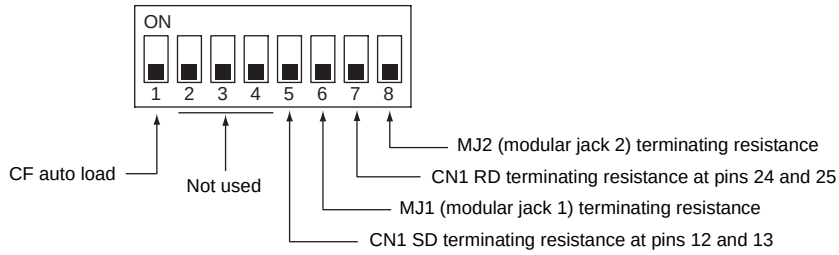
- Connection example with Mitsubishi A1SJ71UC24-R4 (3 sets)



Terminating Resistance Setting

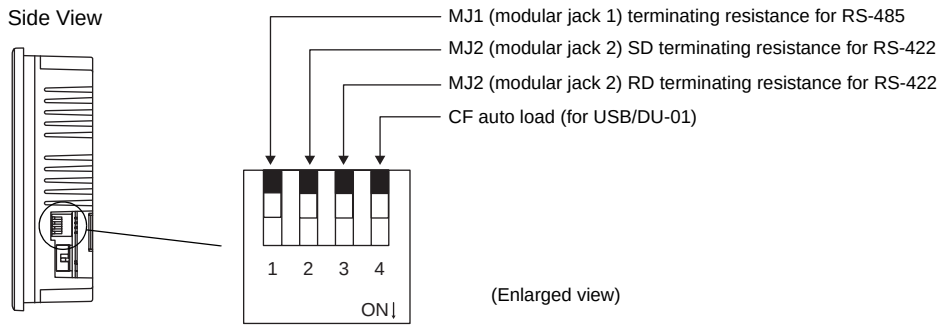
For V7 Series:

- The terminating resistance should be set on the DIP switch in the backside of the unit.
- When MJ1 is used: Set DIPSW6 to the ON position.
  When MJ2 is used: Set DIPSW8 to the ON position.



For V706:

- The terminating resistance should be set on the DIP switch in the side of the unit.
- Set DIPSW1 to the ON position.



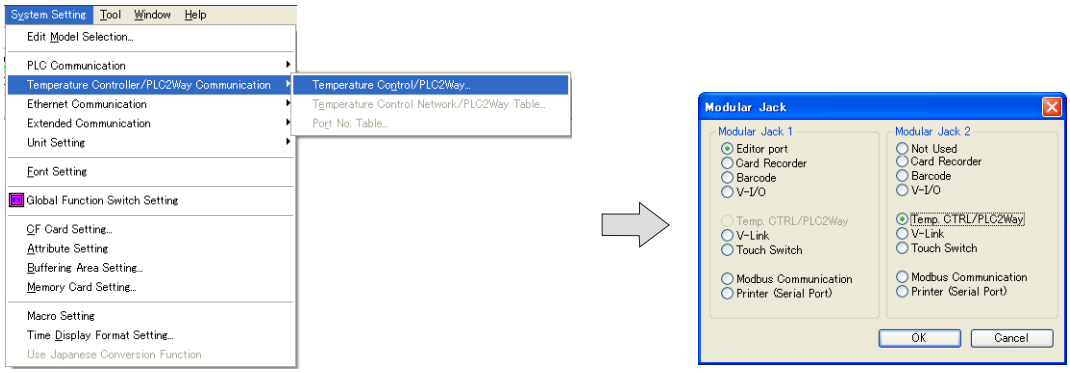
V-SFT Setting

PLC model selection and parameter setting to be made on the V-SFT editor for the PLC2Way connection at the MJ port are explained.

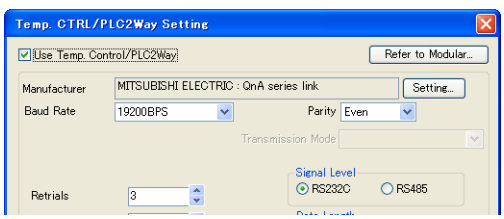
Temp. CTRL/PLC2Way Setting

Select the PLC model and make the parameter setting as described below.

1. Select [System Setting] → [Temperature Controller/PLC2Way Communication] → [Temperature Control/PLC2Way]. The [Modular Jack] dialog is displayed. Select [Temp. CTRL/PLC2Way] for modular jack 1 or 2 that is used for PLC2Way communication.

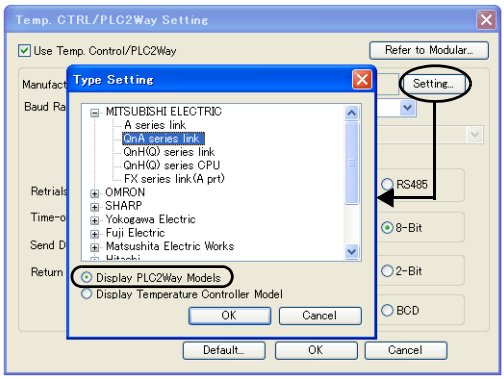


2. The [Temp. CTRL/PLC2Way Setting] dialog is displayed.

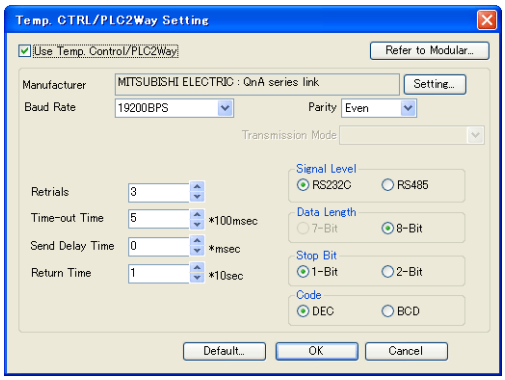


3. Select the PLC model to be connected at the MJ port.

   1) Click the [Setting] button. The [Type Setting] dialog is displayed.
   2) Select [PLC2Way]. The PLC manufacturer names who support PLC2Way communication are displayed.
   3) Click [+]. The available model names of the selected manufacturer are displayed.
   4) Select the PLC model name and click [OK]. The message communication “Communication parameters are reset. OK?” is displayed.
   5) Click [Yes].



4. Set the parameters for the PLC to be connected at the MJ port.



[Baud Rate] (4800, 9600, 19200, 38400, 57600, 115000, 115k, bps)
Select the communication speed with the PLC connected at the MJ port.

[Parity] (None/Odd/Even)
Select the parity setting for communications with the PLC connected at the MJ port.

[Signal Level] (RS-232C/RS-485)
Select the signal level for communications with the PLC connected at the MJ port.

[Data Length] (7-bit/8-bit)
Select the data length for communications with the PLC connected at the MJ port.

[Stop Bit] (1-bit/2-bit)
Select the stop bit setting for communications with the PLC connected at the MJ port.

[Retrials]
Set the number of retrials to be attempted in the case that a communication error occurs.

[Time-out Time] (× 100 msec)
Select the receive time of the response from the PLC connected at the MJ port. If no response is received within the specified time, a retrial is attempted.

[Send Delay Time] (× msec)
Set a time delay in sending the response to the PLC after receipt of data from the PLC connected at the MJ port.

[Return Time] (× 10 sec)
When the PLC in the PLC2Way communication is turned off, data read from the PLC is temporarily prohibited. An inquiry for restoration is sent each time the specified return time has elapsed.

[Code] (DEC/BCD)
Choose the code for entering numerical data into the PLC in the PLC2Way communication. For numerical data, such as those for data displays or data sampling in the sampling mode, BCD or DEC should be chosen for [Input Type].

•The following options may be set depending on the PLC model.

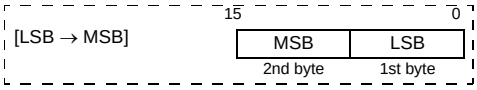
- MITSUBISHI: A series Link, FX series Link (A Protocol)
  [Trans. Mode] (Trans. Mode 1/Trans. Mode 4)
  Trans. Mode 1: Without CR/LF
  Trans. Mode 4: With CR/LF
- OMRON: SYSMAC C, SYSMAC CV, SYSMAC CS1
  [Trans. Mode] (Trans. Mode 1/Trans. Mode 2)
  Trans. Mode 1: Standard (BCD without signs)
  Trans. Mode 2: Special BCD (BCD with sign)
- Yokogawa: FA-M3, FAM3R
  [Trans. Mode] (with sum check/without sum check)

5. To reset the setting, click the [Default] button, or set the desired value.

Text Processing

For the PLC connected at the MJ port, text processing cannot be set in the [Temp. Control/PLC2Way Comm. Setting] dialog.

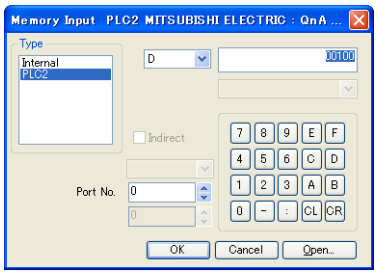
- Text processing
  For processing characters, the arrangement of the 1st and 2nd bytes in one word is fixed as LSB → MSB as shown on the right.



PLC2 Memory Setting

Setting the PLC memory (PLC2 memory) connected at the MJ port

1. Open the [Memory Input] dialog for the part.



2. For the PLC memory connected at the MJ port, select [PLC2 Memory] for [Type] and specify the memory address.
3. Set the port number of the PLC.

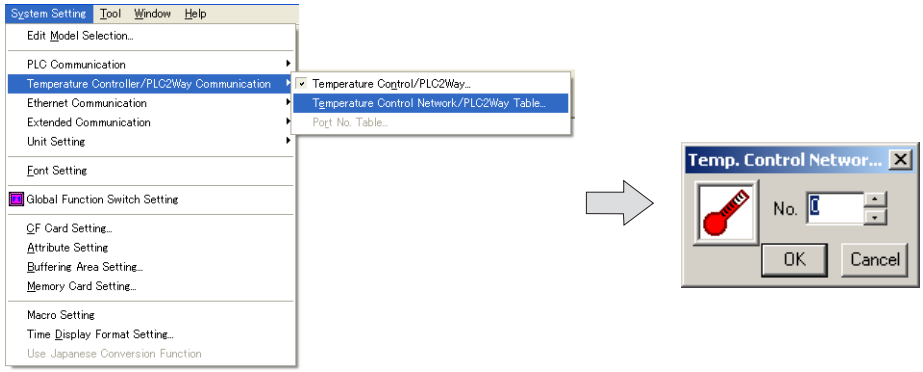
Temperature Control Network/PLC2Way Table

The following operations are available when the temperature control network/PLC2Way table is used.

- “Reading the PLC2 Memory” (page App1-13)
- “Writing into PLC2 Memory (V7 series only)” (page App1-17)
- “Sampling from the PLC2 Memory” (page App1-22)
- “Transferring Data in the PLC2 Memory” (page App1-25)

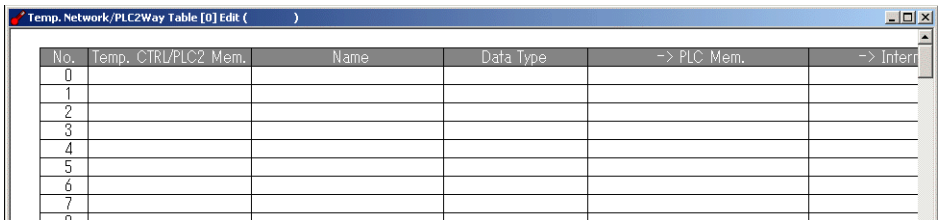
Starting

1. Click [System Setting] → [Temperature Controller/PLC2Way Communication] → [Temperature Control Network/PLC2Way Table].
   * [Temperature Control Network/PLC2Way Table] becomes active only when the setting in the [Temp. CTRL/PLC2Way Setting] dialog has been completed as described in the previous section.



2. Set the temperature control network/PLC2Way table number (0 to 31) and click [OK].

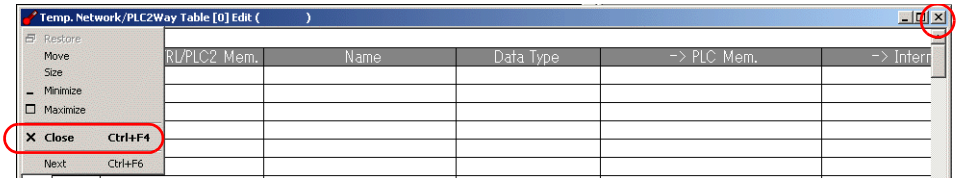
3. The [Temp. CTRL Network/PLC2Way Table Edit] window is opened.



There are 32 tables of temperature control network/PLC2Way table No. 0 to 31. A maximum of 128 addresses of the PLC2 memory can be set.

Closing

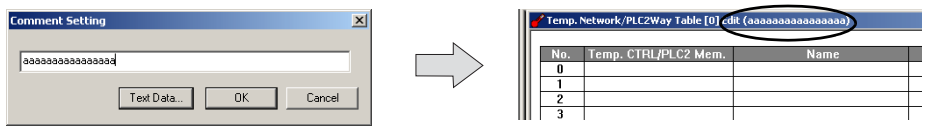
Click [Close] in the drop-down menu, or click the [Close] button at the top right corner.



Comment Setting

There are 32 temperature control network/PLC2Way tables and a comment can be set for each table.

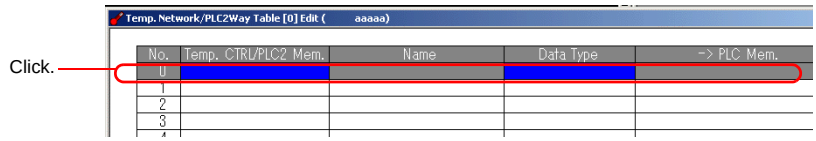
1. Click [Edit] → [Comment]. The [Comment Setting] dialog is displayed.



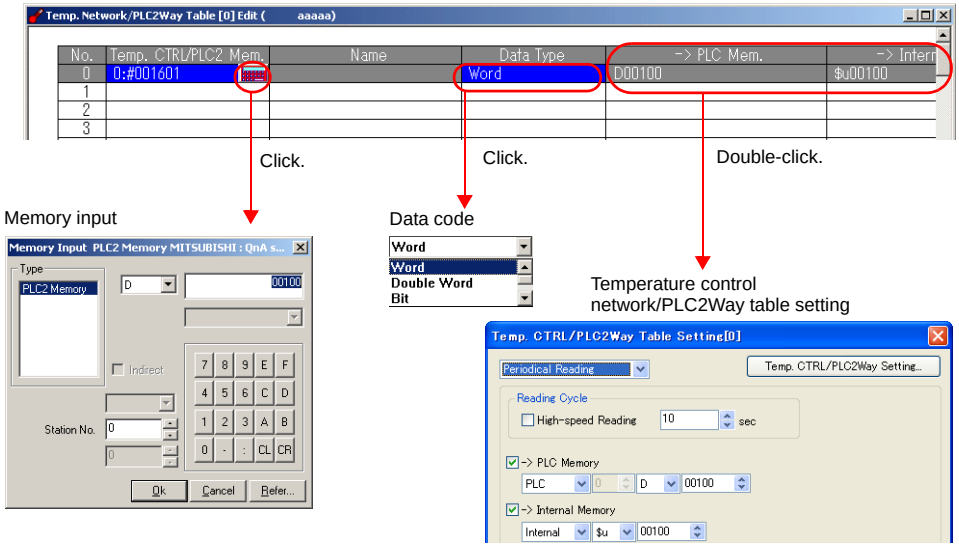
2. Enter the desired comment and click [OK]. The entered comment is displayed at the top right corner.

Setting Data in the Table

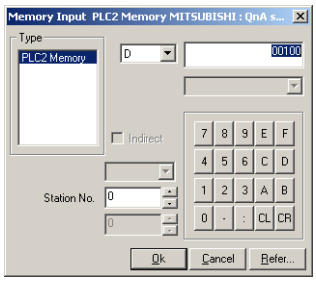
1. Click on a line in the table. The selected line turns blue.



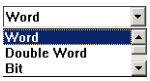
2. Double-clicking brings up the default setting for the PLC2 memory, data type, etc.



1) [Memory Input] dialog
Set the PLC2 memory.



2) Data code



[Word]
Data in the PLC2 memory is handled as numerical data of one word.
Data is converted to the numerical data code of the target memory address and transferred to the address.

[Double Word]
Data in the PLC2 memory is handled as numerical data of two words.
Data is converted to the numerical data code of the target memory address and transferred to the address.

[Bit]
Data in the PLC2 memory is handled as bit information of one word.
Data is transferred to the target memory address without conversion.

[Dummy Word] [Dummy Double]

The memory addresses for [PLC Memory] and [Internal Memory] are automatically allocated consecutively in the [Temp. CTRL/PLC2Way Table Setting] dialog. If you would like to skip any memory address, keep the cell in the [Temp. CTRL/PLC2 Mem.] column blank (no setting). It is regarded as a dummy word or double-word.

- For reading: "0" is always stored in the target memory address. The memory is not usable for any other purposes.
- For writing: The memory is usable for other purposes.

<Example: [Word] [Bit]>

Data transfer using the temperature control network/PLC2Way table is based on the [Code] settings in the [Comm. Parameter] dialog and the [Temp. Control/PLC2Way Comm. Setting] dialog plus the [Data Type] setting in the [Temp. Network/PLC2Way Table Edit] window. Within the V7 series, data is normally handled as DEC with signs.

- [Word] [Double Word]

		Code	Bit
Periodical reading ↓	Temperature control/PLC2 memory	Temperature control/PLC2Way communication setting BCD	MSB 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 LSB 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0
	V7 series internal memory	DEC	MSB 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 LSB 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0
	PLC memory	Communication parameter setting DEC	MSB 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 LSB 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0
		Communication parameter setting BCD	MSB 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 LSB 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0

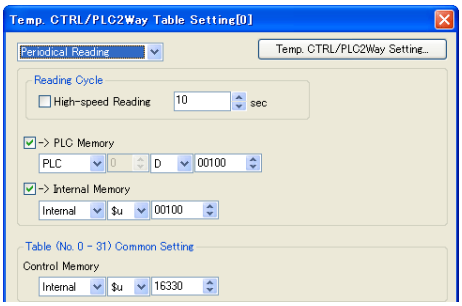
- [Bit]

		Code	Bit
Periodical reading ↓	Temperature control/PLC2 memory	Temperature control/PLC2Way communication setting BCD	MSB 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 LSB 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0
	V7 series internal memory	DEC	
	PLC memory	Communication parameter setting DEC BCD	

3) [Temperature Control Network/PLC2Way Table Setting] dialog

In this dialog, set the use of each table.

- TEMP_READ, TEMP_WRITE
- Periodical Reading
- Synchronized Reading
- Periodical Writing
- Synchronized Writing

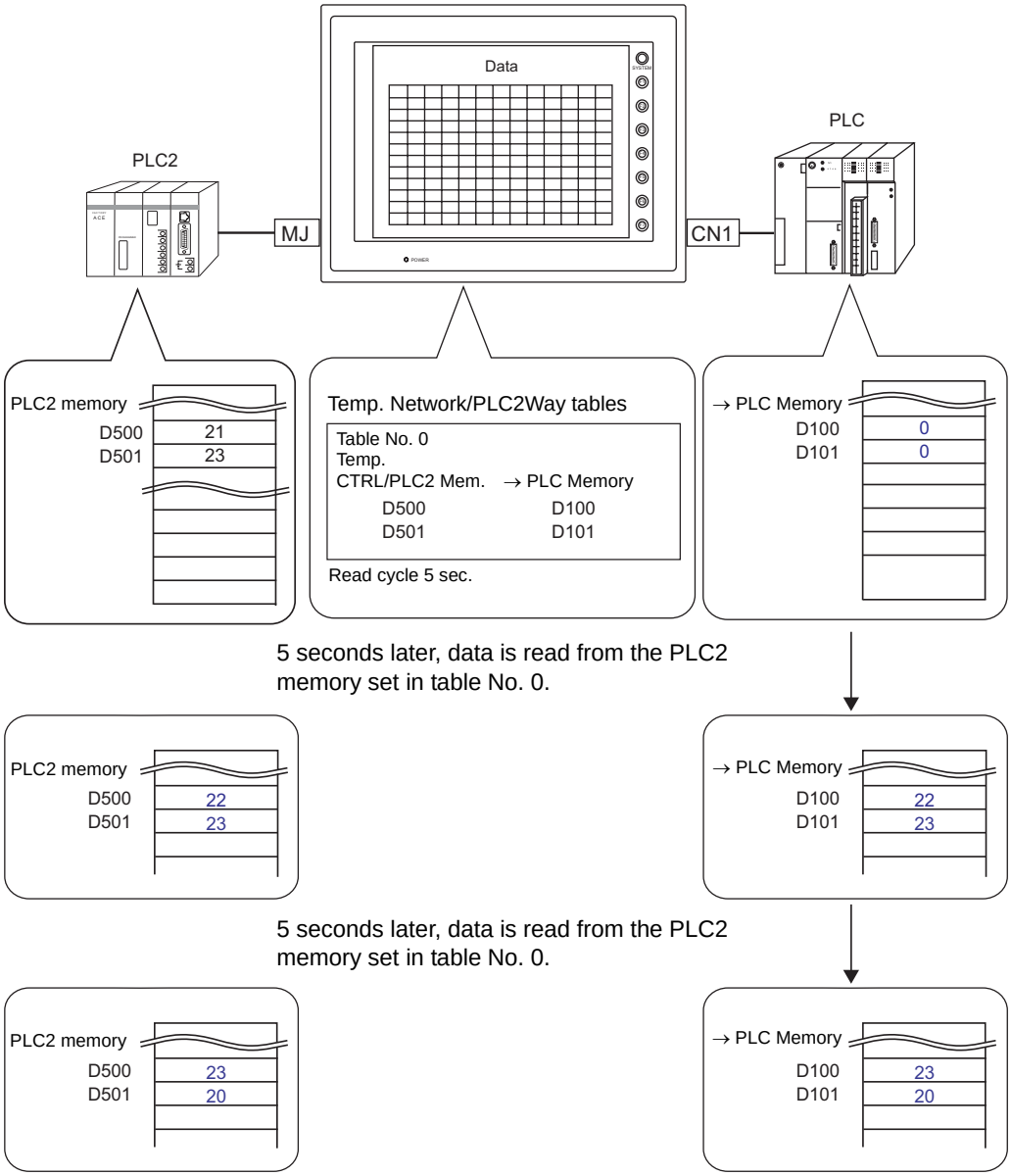


Reading the PLC2 Memory

It is possible to read data from the PLC2 memory registered in the temperature control network/PLC2Way table into the PLC memory (or the V series internal memory). Reading can occur at regular intervals ([Periodical Reading]) or at the time of bit setting ([Synchronized Reading]).

Periodical Reading

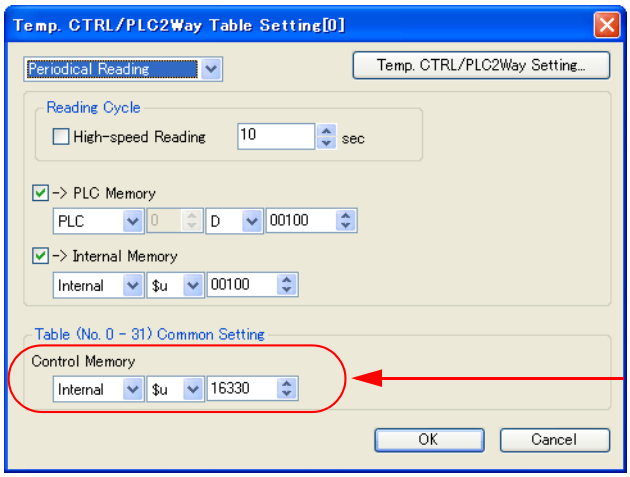
Data is read from the PLC2 memory into the PLC memory (or the V series internal memory) at regular intervals as set in the [Temp. CTRL/PLC2Way Table Setting] dialog.



Setting Items

Setting items necessary for periodical reading

- “Temperature Control Network/PLC2Way Table” (page App1-9)
- Temperature control network/PLC2Way table setting



[Periodical Reading]
Select [Periodical Reading]. The following setting items become active.

[Read Cycle] (sec)
Set the cycle of reading data in the PLC2 memory.

[High Speed Reading]	Read Cycle	
	Setting Range	Unit
Unchecked	1 - 3600	1 s
Checked	1 - 3600	100 ms

[→ PLC Memory]
When storing data read from the PLC2 memory into the PLC memory, check this box and set the desired top memory address.

[→ Internal Memory]
When storing data read from the PLC2 memory into the V series internal memory, check this box and set the desired top memory address.

[Control Memory]
This option is disabled when [Use Periodical Reading] is selected.

[Temp./PLC2Way Comm. Setting]
Clicking this button brings up the [Temp. CTRL/PLC2Way Comm. Setting] dialog and allows you to review the setting.

Synchronized Reading (V7 series only)

It is possible to read from the temperature control network/PLC2Way table memory into the PLC memory (V series internal memory) at the leading edge (0 → 1) of a control memory bit.

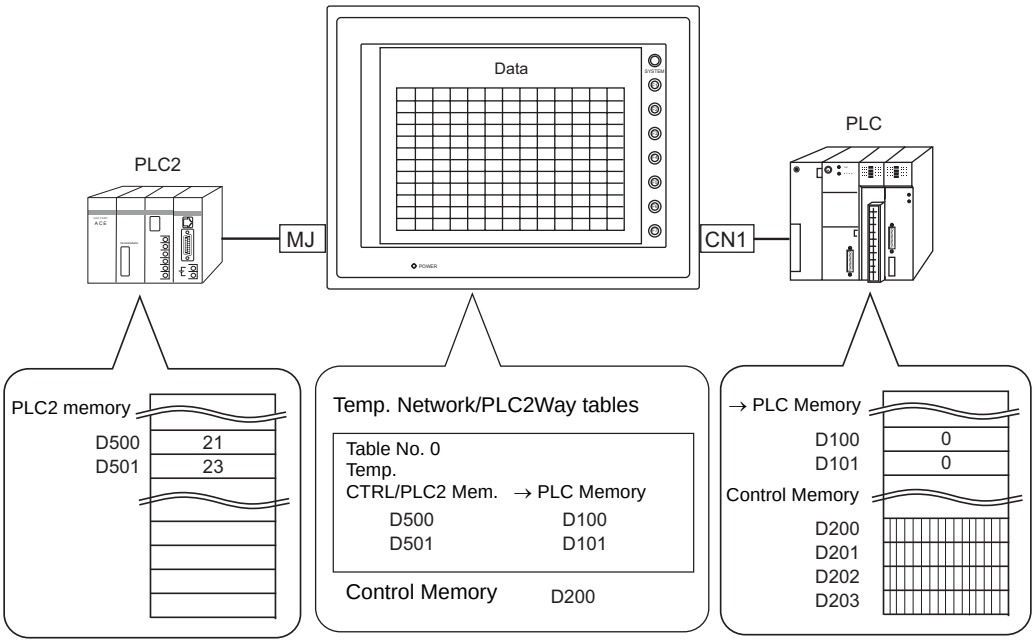
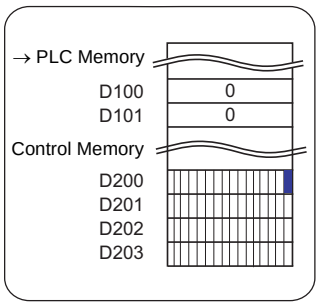
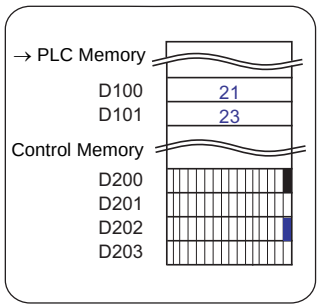


Table No. 0 control memory bit ON



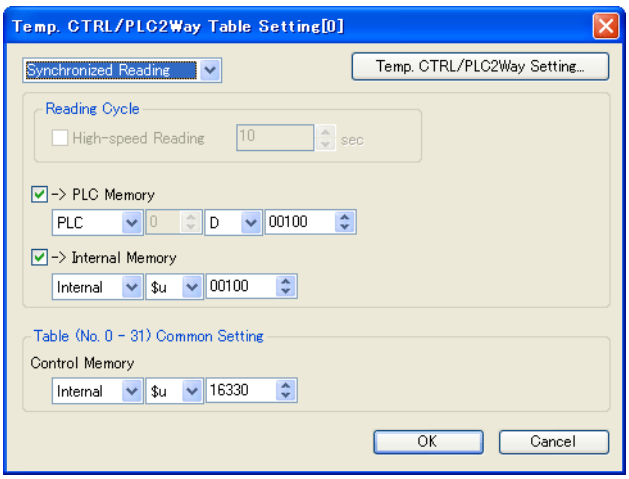
Reading the table No. 0 PLC2 memory and setting (ON) the confirmation memory bit



Setting Items

Setting items necessary for synchronized reading

- “Temperature Control Network/PLC2Way Table” (page App1-9)
- Temperature control network/PLC2Way table setting



[Synchronized Reading]
Select [Synchronized Reading]. The following setting items become active.

[→ PLC Memory]
When storing data read from the PLC2 memory into the PLC memory, check this box and set the desired top memory address.

[→ Internal Memory]
When storing data read from the PLC2 memory into the V series internal memory, check this box and set the desired top memory address.

[Control Memory]
Select the memory address as a trigger for reading the temperature control network/PLC2Way memory.
The specified memory address is used for temperature control network/PLC2Way table Nos. 0 to 31. For more information, refer to “Control Memory” (page App1-21).

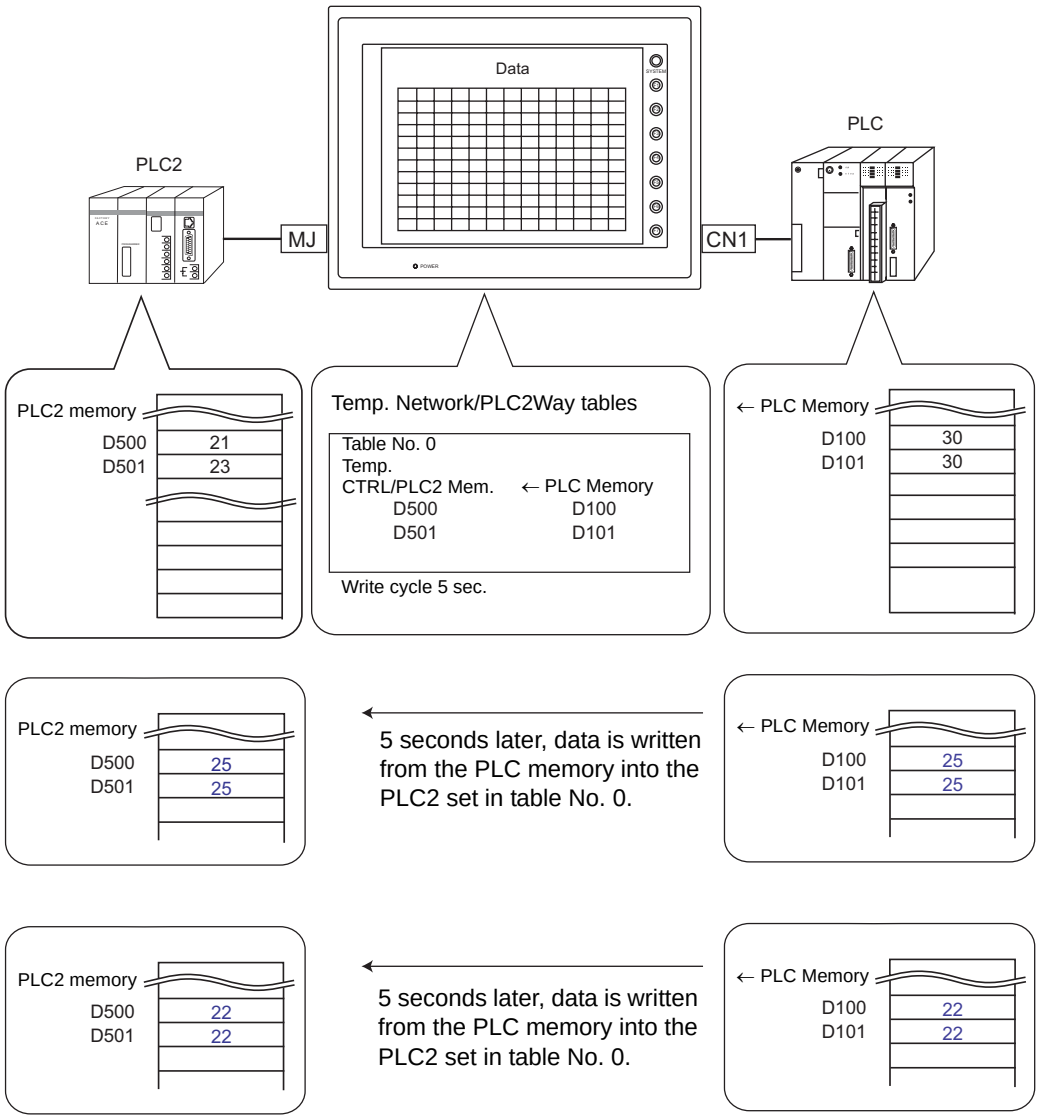
[Temp./PLC2Way Comm. Setting]
Clicking this button brings up the [Temp. CTRL/PLC2Way Comm. Setting] dialog and allows you to review the setting.

Writing into PLC2 Memory (V7 series only)

It is possible to write data from the PLC memory or the V series internal memory into the PLC2 memory registered in the temperature control network/PLC2Way table. Writing can occur at regular intervals ([Periodical Writing]) or at the time of bit setting ([Synchronized Writing]).

Periodical Writing

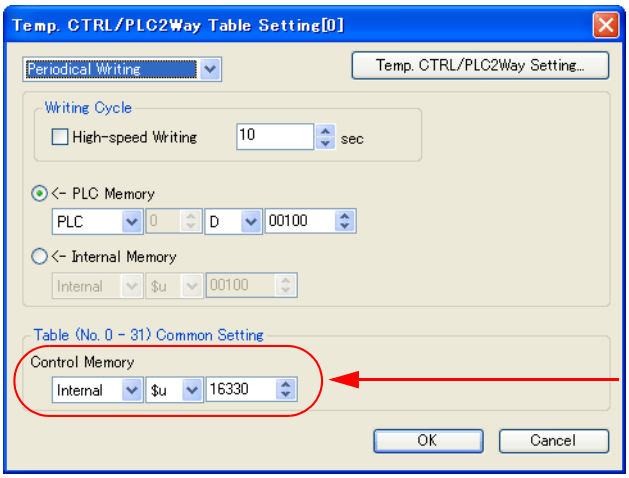
Data is written from the PLC memory (V series internal memory) into thePLC2 memory at regular intervals as set in the [Temp. CTRL/PLC2Way Table Setting] dialog.



Setting Items

Setting items necessary for periodical writing

- “Temperature Control Network/PLC2Way Table” (page App1-9)
- “Temperature control network/PLC2Way table setting”



Disabled when [Periodical

[Periodical Writing]
Select [Periodical Writing]. The following setting items become active.

[Write Cycle] (sec)
Set the cycle of writing data in the PLC2 memory.

[High Speed Reading]	Read Cycle	
	Setting Range	Unit
Unchecked	1 - 3600	1 s
Checked	1 - 3600	100 ms

[← PLC Memory]
Check this item when writing data from the PLC memory into the PLC2 memory. Enter the desired top memory address.

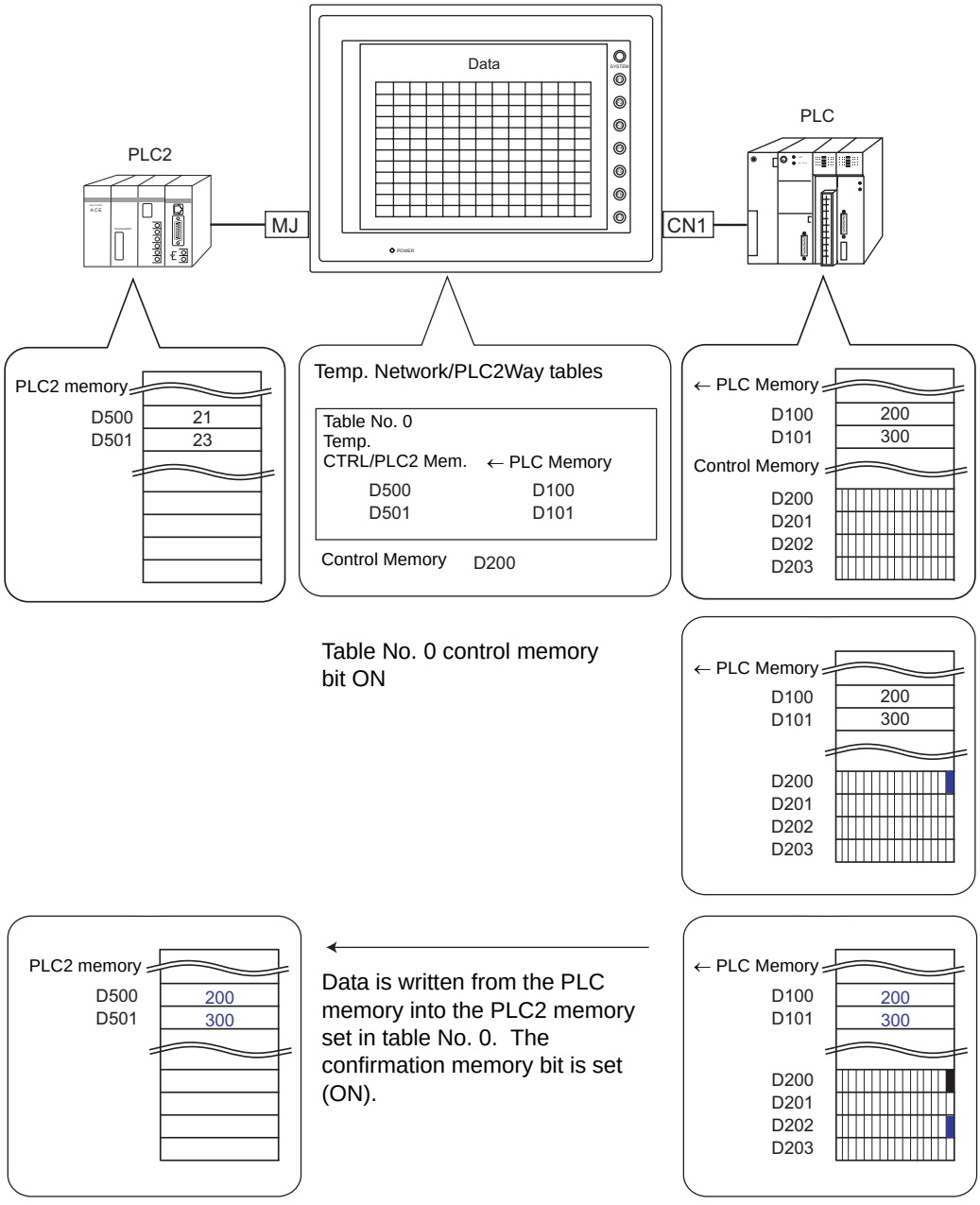
[← Internal Memory]
Check this item when writing data from the internal memory into thePLC2 memory. Enter the desired top memory address.

[Control Memory]
This option is disabled when [Periodical Writing] is selected.

[Temp./PLC2Way Comm. Setting]
Clicking this button brings up the [Temp. CTRL/PLC2Way Comm. Setting] dialog and allows you to review the setting.

Synchronized Writing (V7 series only)

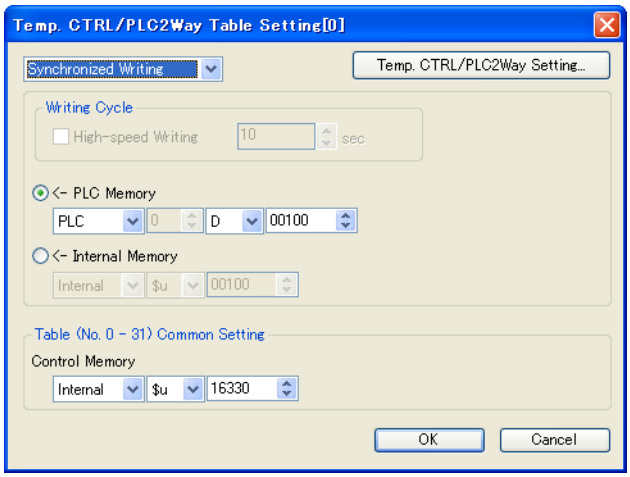
Data is written from the PLC memory (V series internal memory) into the PLC2 memory set in the temperature control network/PLC2Way table at the leading edge (0 → 1) of the control memory bit.



Setting Items

Items that must be set to perform synchronized writing

- “Temperature Control Network/PLC2Way Table” (page App1-9)
- Temperature control network/PLC2Way table setting



[Synchronized Writing]
Select [Synchronized Writing]. The following setting items become active.

[← PLC Memory]
Check this item when writing data from the PLC memory into the PLC2 memory. Enter the desired top memory address.

[← Internal Memory]
Check this item when writing data from the internal memory into thePLC2 memory. Enter the desired top memory address.

[Control Memory]
Enter a memory address as the trigger for writing from the PLC2 memory (or the V series internal memory).
The specified memory address is used for temperature control network/PLC2Way table Nos. 0 to 31. For more information, refer to “Control Memory” (page App1-21).

[Temp./PLC2Way Comm. Setting]
Clicking this button brings up the [Temp. CTRL/PLC2Way Comm. Setting] dialog and allows you to review the setting.

Control Memory

Control memory becomes effective for executing synchronized reading/synchronized writing.
Consecutive four words starting from control memory “n” are allocated.

Control memory n	Contents	Memory Type
n	Read/Write command memory	→ V
n + 1		
n + 2	Read/Write confirmation memory	← V
n + 3		

[Read/Write command memory] (control memory “n” and “n + 1”)

One bit is allocated to each table.
At the leading edge (0 → 1) of a bit, reading from or writing to memory set in the corresponding temperature control network/PLC2Way table occurs.

n

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	← Bit number
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	

Temperature control network/PLC2Way table Nos. 0 - 15

n + 1

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	← Bit number
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	

Temperature control network/PLC2Way table Nos. 16 - 31

[Read/Write confirmation memory] (control memory “n + 2” and “n + 3”)

One bit is allocated to each table.
When a bit of the control memory “n” or “n + 1” is set (ON), the confirmation memory bit for the corresponding table number is set (0 → 1). When a bit of the control memory “n” or “n + 1” is reset (OFF), the confirmation memory bit for the corresponding table number is reset (1 → 0).

n + 2

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	← Bit number
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	

Temperature control network/PLC2Way table Nos. 0 - 15

n + 3

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	← Bit number
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	

Temperature control network/PLC2Way table Nos. 16 - 31

* Confirmation memory bit ON (0 → 1) timing
When the bit of the command memory is set (0 → 1) and the resulting reading or writing is complete, the bit of the confirmation memory is set (ON).

Sampling from the PLC2 Memory

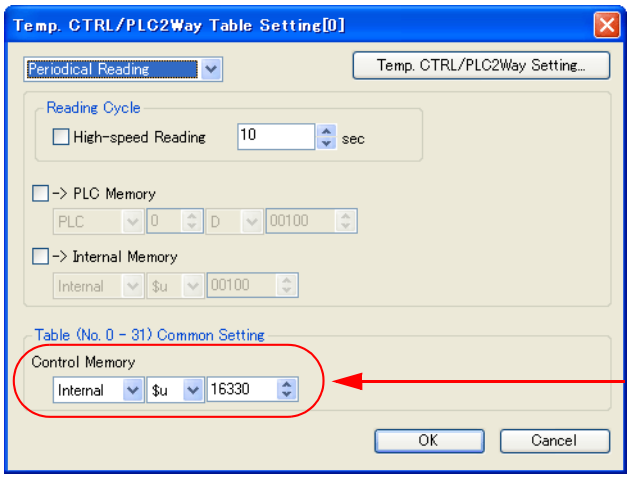
It is possible to sample data in the PLC2 memory at regular intervals.

Setting Items

Setting necessary for constant sampling

- “Temperature Control Network/PLC2Way Table” (page App1-9)
- Temperature Control Network/PLC2Way Table Setting
- Buffering area setting
- Trend sampling or data sampling
- Memory card setting
  (when [SRAM] or [CF Card] is selected for [Store Target] in the [Buffering Area Setting] dialog)

Temperature Control Network/PLC2Way Table Setting



Disabled when [Periodical

[Periodical Reading]
Select [Periodical Reading]. The following setting items become active.

[Read Cycle] (sec)
Set the cycle of reading data in the PLC2 memory.

[High Speed Reading]	Read Cycle	
	Setting Range	Unit
Unchecked	1 - 3600	1 s
Checked	1 - 3600	100 ms

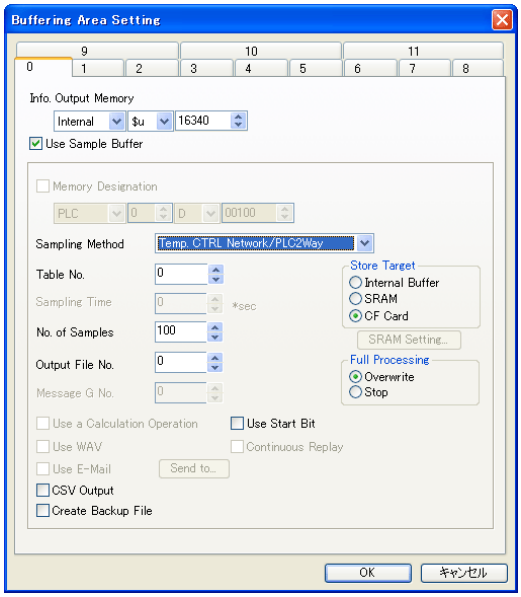
[→ PLC Memory] [→ Internal Memory]
Do not check these boxes.
Since sampling data is stored in the internal buffer, SRAM or CF card, it is not necessary to set these items.

[Control Memory]
This option is disabled when [Use Periodical Reading] is selected.

[Temp./PLC2Way Comm. Setting]
Clicking this button brings up the [Temp./PLC2Way Comm. Setting] dialog and allows you to review the setting.

Buffering Area Setting

Click [System Setting] → [Buffering Area Setting]. The [Buffering Area Setting] dialog is opened.



[Sampling Method]
Temp. Control Net/PLC2

[No. of Table]
Select the temperature control network/PLC2Way table number for sampling.

[No. of Samples]
Specify the number of sampling times.

[Output File No.]
This item becomes active when [SRAM] or [CF Card] is selected for [Store Target].

[Store Target] (Internal Buffer/SRAM/CF Card)
Choose the desired medium for storing sampling data.
- Internal Buffer: Stores data in the internal buffer of the V series. (RAM)
- SRAM: Stores data in the SRAM area.
  V7 series: SRAM mounted on the unit, V7EM-S, REC-MCARD SRAM, V706EM-S
  V6 series: V6EM/RS, V6EM/RSi, REC-MCARD SRAM
- CF Card: Stores data in the CF card. (V7 series, V608CH)

[Full Processing] (Continuous/Stop)
Choose the desired processing when the target medium space has been used up.
- Continuous: When [No. of Samples] has been exceeded, data from the oldest is discarded.
- Stop: When [No. of Samples] has been exceeded, sampling is stopped.

[Use Start Bit], [CSV Output], [Create Backup File]
For more information on them, refer to “Appendix 1 Buffering Area” in the Reference Manual.

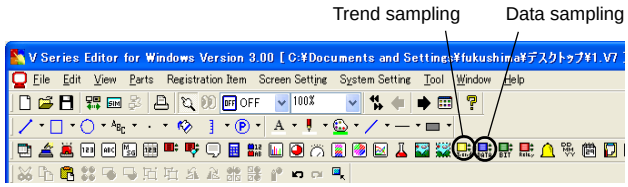
- Calculating the buffering area capacity
  When [Internal Buffer] is selected for [Store Target] in the [Buffering Area Setting], the maximum available capacity is 32k words.
  When [Temp Control Net/PLC2] is selected for [Sampling Method], the required capacity can be calculated as shown below.

  1 sample = [Words*] + 2 words
  Buffer size = [No. of Samples] × 1 sample

  * [Words] here means the number of words in the memory addresses used in the temperature control network/PLC2Way table that is set for [No. of Table].

Trend Sampling or Data Sampling Setting

To show data stored in the specified buffer number, trend sampling or data sampling must be set. Click the [Trend Sampling] or [Data Sampling] icon and make the setting.
For more information, refer to the Reference Manual.

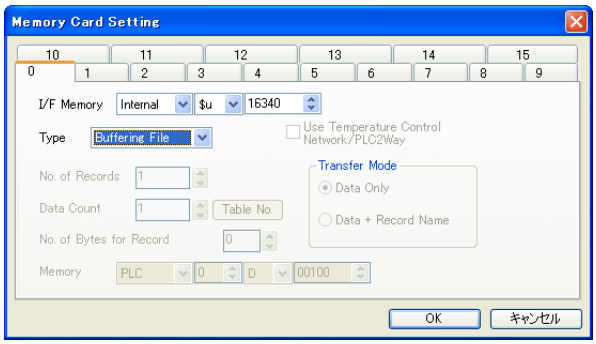


Memory Card Setting

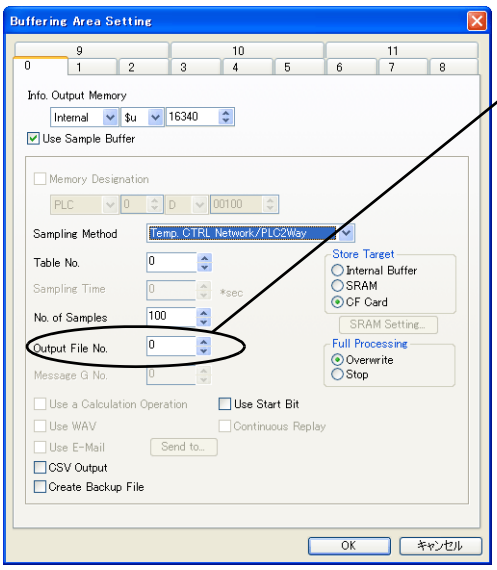
When [SRAM] or [CF Card] is selected for [Store Target] in the [Buffering Area Setting] dialog, the memory card setting is required.

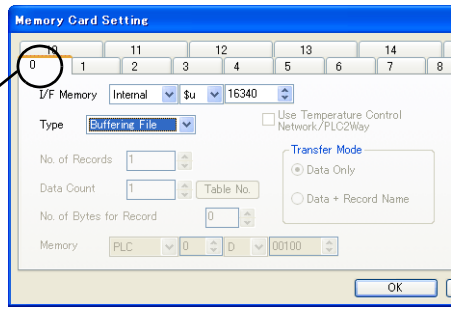
* The used memory capacity of SRAM and CF card can be calculated in the same way as the buffering area.

1. Click [System Setting] → [Memory Card Setting]. The [Memory Card] dialog is opened.



2. Select [Buffering File] for [Type].
3. Match the file number (tab) in the [Memory Card] dialog with [Output File No.] in the [Buffering Area Setting] dialog.





Select the tab of the same number.

Transferring Data in the PLC2 Memory

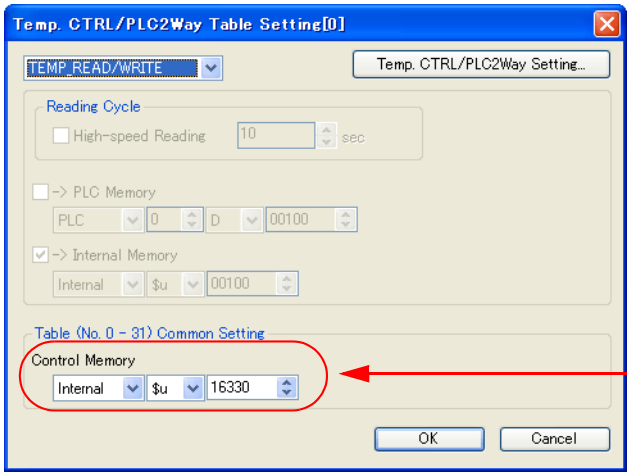
Data in the PLC2 memory can be transferred to the PLC memory, V series internal memory or a memory card at one time according to the temperature control network/PLC2Way table. Conversely, it is also possible to transfer data in the PLC memory, V7 internal memory or a memory card to the PLC2 memory at one time.
To transfer data at one time, use a macro command (TEMP_READ/ TEMP_WRITE).

Setting Items

Setting necessary for trasferring PLC2 memory

- “Temperature Control Network/PLC2Way Table” (page App1-9)
- Temperature Control Network/PLC2Way Table Setting
- Macro (TEMP_READ/TEMP_WRITE)
- Memory card setting (when a memory card is used)

Temperature Control Network/PLC2Way Table Setting



Disable when [TEMP_READ/WRITE] is selected.

[TEMP_READ/WRITE]
Select [TEMP_READ/WRITE].

Macro

[TEMP_READ]
Data in the PLC2 memory addresses set in the temperature control network/PLC2Way table specified for F1 is transferred to the memory addresses starting from F0.

Usable Devices

	PLC Memory	Internal Memory	Constant (Temperature Control Table No.)	Memory Card	Indirect Designation
F0	○	○		○	○
F1		○	○		

TEMP_READ: Temperature control network table read

TEMP_READ F0 <- TABLE : F1

[TEMP_WRITE]

Data in memory addresses starting from F1 is transferred to the PLC2 memory of the temperature control network/PLC2Way table specified for F0.

Usable Devices

	PLC Memory	Internal Memory	Constant (Temperature Control Table No.)	Memory Card	Indirect Designation
F0		○	○		
F1	○	○		○	○

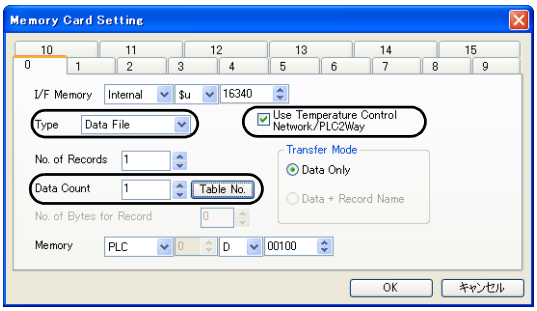
TEMP_WRITE: Temperature control network table write

TEMP_WRITE TABLE : F0 <- F1

Memory Card Setting

The memory card setting should be made when the memory card is used as the source or target memory for a macro command.

1. Click [System Setting] → [Memory Card Setting]. The [Memory Card] dialog is opened.
2. Select [Data File] for [Type].
   Check [Use Temp. Control Net/PLC2Way].
3. Click the [Table No.] button and select the table number to be used. The appropriate number is automatically set for [No. of Data].



Indirect Memory Designation

It is possible to have access to the PLC2 memory using the indirect memory designation as a macro command.
In this section, the indirect designation of the PLC2 memory is explained.
The internal user memory ($u) is used for the indirect memory designation.

Designating the indirect memory

- PLC2 memory

<0 to 65535>

	15 – 8	7 – 0
n + 0	Model (03)	Memory type
n + 1	Memory number (address)	
n + 2	00	Bit designation
n + 3	00	Port

<65536 and above>

	15 – 8	7 – 0
n + 0	Model (83)	Memory type
n + 1	Memory number (address) upper	
n + 2	Memory number (address) lower	
n + 3	00	Bit designation
n + 4	00	Port number

- Memory type
  Depends on the PLC model.
  Refer to “Available Memory” in “Chapter 2” to “Chapter 33” when setting.
- Port number
  Set the port number of the PLC connected at the MJ port.

User Log Read for Yokogawa’s PLC

The user log set with Yokogawa’s PLC “FA-M3/FA-M3R” connected at the MJ port can be read using the macro command TEMP_CTL.

Macro

[TEMP_CTL]

This macro command controls the operation set in the memory addresses starting from the one specified for F0 for the number of words specified for F1.

Usable Devices

	PLC Memory	Internal Memory	Constant (Words)	Memory Card	Indirect Designation
F0		○			
F1			○		

TEMP_CTL: Temperature controller/PLC2Way control function

TEMP_CTL F0 F1

	F0 (= $u n)												F1
	n	n + 1	n + 2	n + 3	n + 4	n + 5	n + 6	n + 7	n + 8	n + 9	n + 10	n + 11	Words
User log registration number read	Port number	CPU No. –1*1 (0 to 3)	Command –1	Registration number*2	–	–	–	–	–	–	–	–	3
Latest user log read	Port number	CPU No. –1*1 (0 to 3)	Command 0	Header 0: Normal –1: Error*3	Year	Month	Day	Hour	Minute	Second	Main code	Sub code	3
					(ASCII)						(DEC)		
“n”th user log read	Port number	CPU No. –1*1 (0 to 3)	Command 1 to 63	Header 0: Normal –1: Error*3	Year	Month	Day	Hour	Minute	Second	Main code	Sub code	3
					(ASCII)						(DEC)		

Return data: Data stored from PLC2Way to V7 series

*1 Set “0” for CPU No. 1.
*2 The registration number is stored in special register Z105.
*3 If there is no user log in the “n + 2” memory or there is an error in communications, [–1] is stored.

Processing Cycle

The processing cycle on the V7 series with the PLC2Way function is explained.

1. When the temperature control network/PLC2Way table is not used:

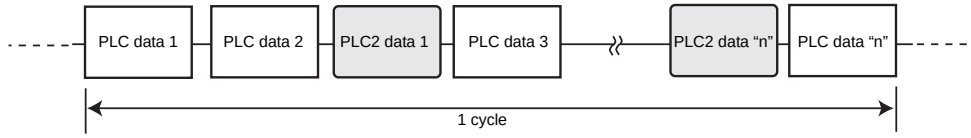
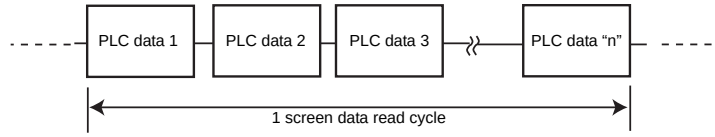


Fig. 1

2. When the temperature control network/PLC2Way table is used:



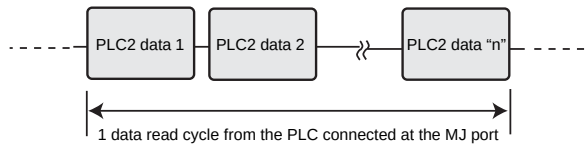


Fig. 2

When the temperature control network/PLC2Way table is not used (Fig. 1), the V series does not communicate with the PLC while it is communicating with the PLC2.
When the temperature control network/PLC2Way table is used (Fig. 2), the V series communicates with the PLC and the PLC2 at the same time.
As a result, the V series can communicate with the PLC2 without reducing the processing capacity for communication with the PLC.

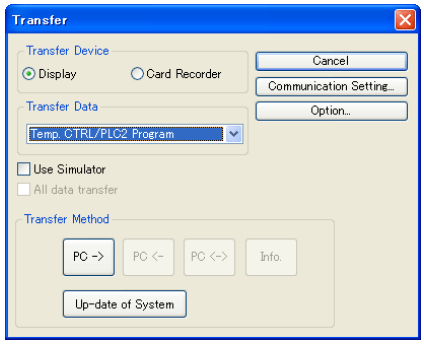
When the temperature control network/PLC2Way table is used:

If periodical reading/writing or synchronized reading/writing based on the temperature control network/PLC2Way table takes place while the V series is accessing the PLC2 memory via a macro command, the progress of the macro execution may be delayed. To avoid this, it is possible to temporarily stop reading from/writing into the PLC2 memory using the system memory addresses ($s762 and 764). For more information, refer to page App1-32.

Notes on Screen Data Transfer

Temperature Control/PLC2 Program

When using the temperature control network/PLC2Way communications, it is necessary to transfer the temperature control/PLC2 program to the V7 series.
When the temperature control network/PLC2Way setting has been made, the program is automatically transferred to the V7 series together with screen data.
When [Temp. CTRL/PLC2 Program] is selected for [Transfer Data] in the [Transfer] dialog, only the temperature control/PLC2 program can be transferred to the V7 series.



When the Main Menu screen is displayed after transferring screen data, the [Extension] switch appears.
Pressing the switch brings up the “Extension Program Info.” screen where the temperature control/PLC2Way driver setting and temperature control network/PLC2way setting can be reviewed.
For details, refer to “Chapter 6, MONITOUCH Operations” in the separate Hardware Specifications for the V7 series or V706.

System Memory

The status of the PLC connected at the MJ port for PLC2Way communications is output to the system memory ($s) of the V7 series.
The memory addresses ($s729 to 764) of the PLC connected at the MJ port are explained.

List

Address	Contents
⋮	⋮
$s729	TEMP_READ/TEMP_WRITE/TEMP_CTL macro execution result
730	Temperature controller/PLC2Way Station No. 00 status
731	Temperature controller/PLC2Way Station No. 01 status
732	Temperature controller/PLC2Way Station No. 02 status
733	Temperature controller/PLC2Way Station No. 03 status
734	Temperature controller/PLC2Way Station No. 04 status
735	Temperature controller/PLC2Way Station No. 05 status
736	Temperature controller/PLC2Way Station No. 06 status
737	Temperature controller/PLC2Way Station No. 07 status
738	Temperature controller/PLC2Way Station No. 08 status
739	Temperature controller/PLC2Way Station No. 09 status
740	Temperature controller/PLC2Way Station No. 10 status
741	Temperature controller/PLC2Way Station No. 11 status
742	Temperature controller/PLC2Way Station No. 12 status
743	Temperature controller/PLC2Way Station No. 13 status
744	Temperature controller/PLC2Way Station No. 14 status
745	Temperature controller/PLC2Way Station No. 15 status
746	Temperature controller/PLC2Way Station No. 16 status
747	Temperature controller/PLC2Way Station No. 17 status
748	Temperature controller/PLC2Way Station No. 18 status
749	Temperature controller/PLC2Way Station No. 19 status
750	Temperature controller/PLC2Way Station No. 20 status
751	Temperature controller/PLC2Way Station No. 21 status
752	Temperature controller/PLC2Way Station No. 22 status
753	Temperature controller/PLC2Way Station No. 23 status
754	Temperature controller/PLC2Way Station No. 24 status
755	Temperature controller/PLC2Way Station No. 25 status
756	Temperature controller/PLC2Way Station No. 26 status
757	Temperature controller/PLC2Way Station No. 27 status
758	Temperature controller/PLC2Way Station No. 28 status
759	Temperature controller/PLC2Way Station No. 29 status
760	Temperature controller/PLC2Way Station No. 30 status
761	Temperature controller/PLC2Way Station No. 31 status
762	Other than “0”: Periodical/synchronized reading suspended
763	Other than “0”: Temperature control network/PLC2Way transfer macro forced execution
764	Other than “0”: Periodical/synchronized writing suspended

Details

$s729

An execution result of macro command TEMP_READ, TEMP_WRITE, or TEMP_CTL is stored at this address.

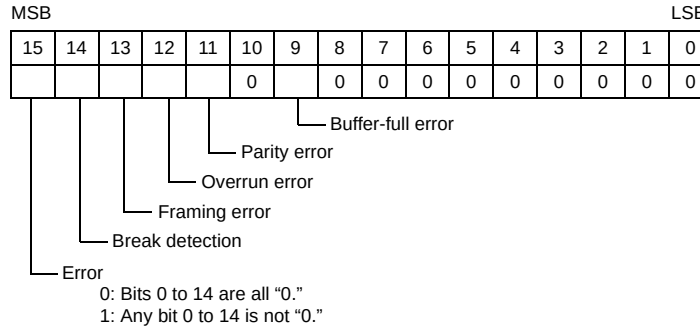
Code	Contents
0000H	Normal
2001H	Memory setting error in the [Temp. CTRL Network/PLC2Way Table]
2002H	Memory is not secured
2004H	Timeout

$s730-761

The following status code for the PLC connected at the MJ port is stored.

Code	Contents
0000H	Normal
FFFFH	Timeout
8001H	Check code error
8002H	Data error
800BH	Error code received from the PLC connected at the MJ port

Errors other than the above are stored as shown below.



Error	Details	Solution
Timeout	Although a request to send is given to the PLC connected at the MJ port, no answer is returned within the specified time.	Check 1, 2, 3 described below.
Check code error	The check code in the PLC connected at the MJ port response was not correct.	Check 1, 3 described below.
Data error	The code of the received data is invalid.	Check 1, 2, 3 described below.
Error code received	An error occurs at the PLC connected at the MJ port.	Refer to the instruction manual for the PLC.
Buffer full	The V7 buffer is full.	Contact your local distributor.
Parity	An error occurred in parity check.	Check 2, 3 described below.
Overrun	After one character is received, the next character is received before internal processing is completed.	Check 1, 3 described below.
Framing	Although the stop bit must be [1], it is detected as [0].	Check 1, 2, 3 described below.
Break detection	SD (TXD) of the PLC connected at the MJ port remains at the low level.	Examine the connection between SD (TXD) of the PLC connected at the MJ port and RD (RXD) of the V7 series.

Solution

1. Check the parameter setting of the PLC connected at the MJ port and the setting in the [Temp. CTRL/PLC2Way Comm. Setting] dialog.
2. Check the cable connection.
3. Data may be disrupted because of noise. Fix noise.

* If you still cannot solve the error even after following the suggestions above, contact your local distributor.

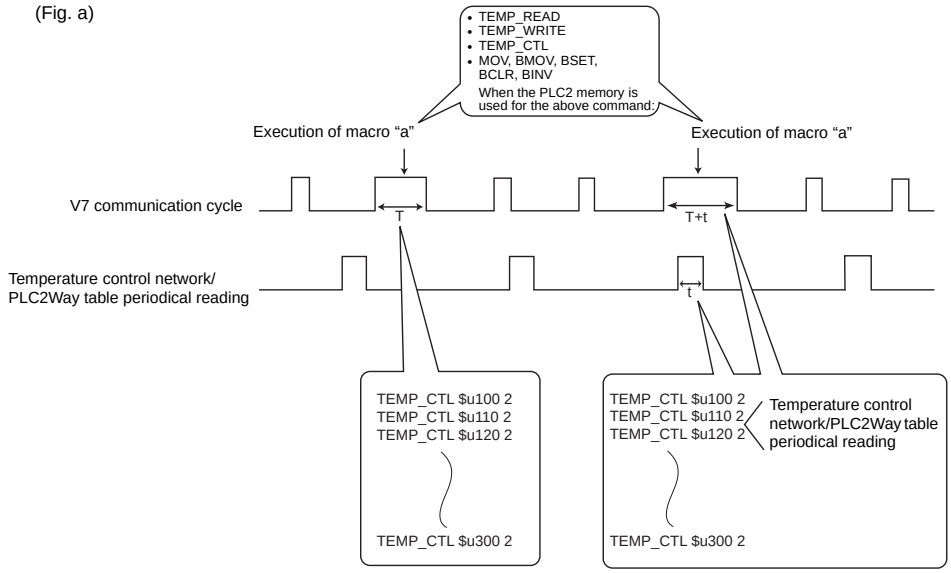
$s762

Periodical or synchronized reading set in the [Temp. CTRL/PLC2Way Table Setting] dialog is suspended.

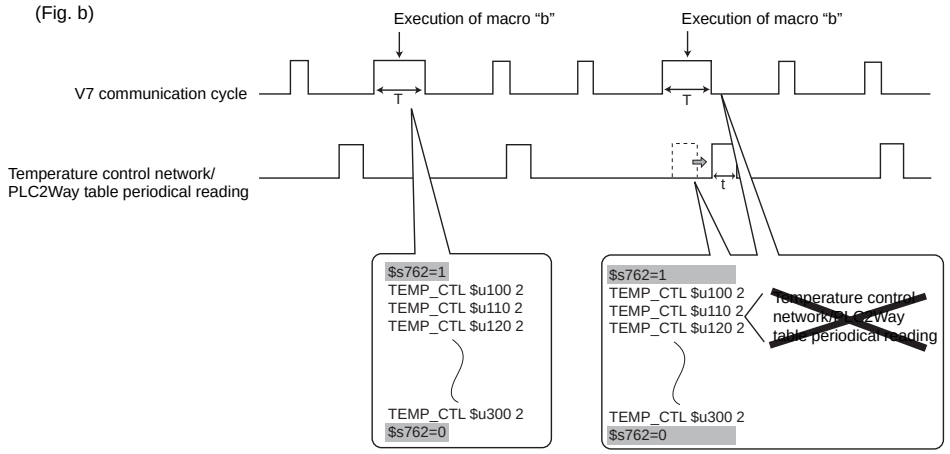
- [0]: Periodical/synchronized reading is performed.
- [Other than “0”]: Periodical/synchronized reading is suspended.

- Example: Periodical reading
  If periodical reading of the temperature control network/PLC2Way table is performed while the PLC2 memory is being accessed using a macro command, the macro execution will be delayed (Fig. a). To avoid this, periodical reading can be suspended using memory address $s762 (Fig. b).

(Fig. a)



(Fig. b)



$s763

Forced execution of macro commands [TEMP_READ] and [TEMP_WRITE] using the temperature control network/PLC2Way table

- [0]: When any station that has failed is included in the specified table, the macro command is not executed.

- [Other than “0”]: The macro command is forcibly executed to the stations that are working properly.

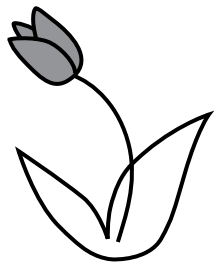
$s764

Periodical or synchronized writing set in the [Temp. CTRL/PLC2Way Table Setting] dialog is suspended.

- [0]: Periodical/synchronized writing is performed.
- [Other than “0”]: Periodical/synchronized writing is suspended.

For the example of the use of the address, refer to “$s762” on page “$s762” (page App1-32).

MEMO

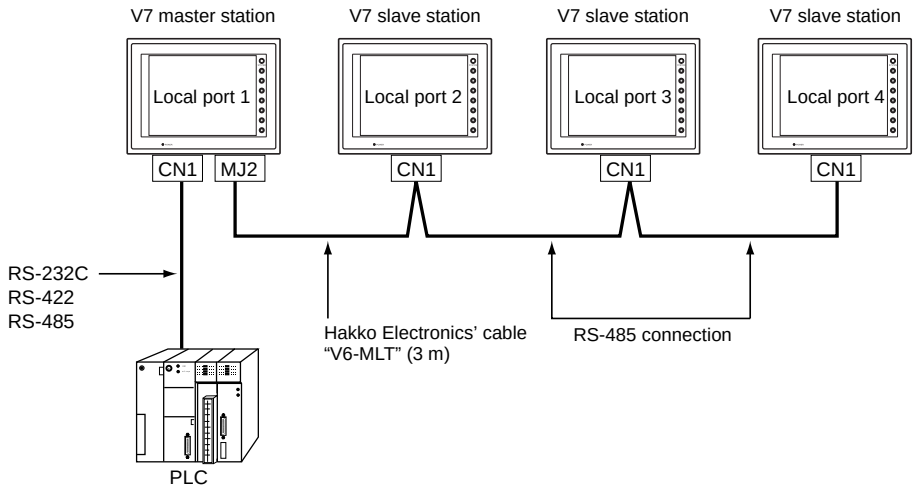


Please use this page freely.

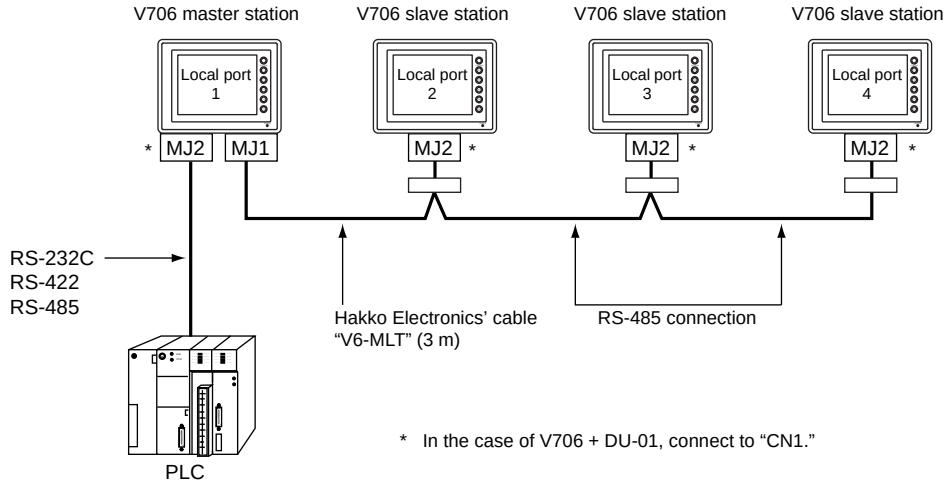
Appendix 2 n : 1 Connection (Multi-link 2)

Multi-link 2

- One PLC is connected to a maximum of four V7 series.
- An original network is created where the V7 series (Local Port 1) that is directly connected to the PLC is the master station, and other three V7 series are slave stations. Only the master station makes communications directly with the PLC, and the slave stations make communications with the PLC via the master station.



On a network with V706 units, a PLC is connected to MJ2 of the master station, the MJ1 of the master station is connected to MJ2 of the slave stations, and the slave stations are connected with each other via MJ2.



* In the case of V706 + DU-01, connect to "CN1."

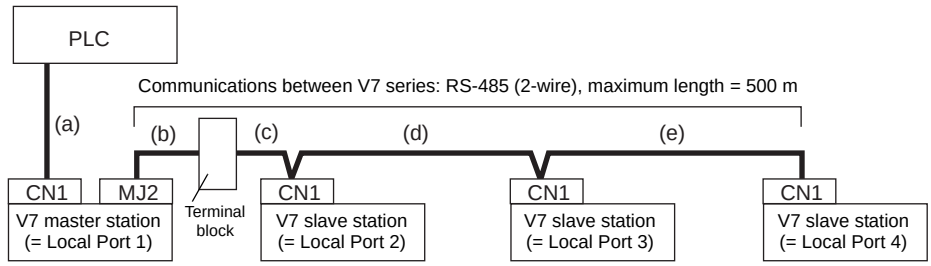
- Communications between the V7 master station and the PLC depend on the communication speed set on the PLC. The maximum available speed for the V7 series is 115 kbps, which is higher than the one available with multi-link connection described in "Appendix 3, n : 1 Connection (Multi-link)."

- This multi-link connection is available with almost all the PLC models that support 1 : 1 connection (refer to the “Appendix”).
  (The connection between the master station and the PLC is the same as the one for 1 : 1 connection.)
- Use the RS-485 2-wire connection between stations of the V7 series. Please use Hakko Electronics’ multi-link 2 master cable (V6-MLT) for connection between the master station (local port 1) and the slave station (local port 2).
- In the following cases, multi-link 2 connection is not available.
  1. A communication interface unit (example: OPCN-1, CC-LINK, Ethernet, etc) is used.
  2. The V6 series (master or slave station) is used for the temperature control network or PLC2Way function.
- The V7 and V6 series can be used together. The V6 series can be the master station. (However, when V609E/V606e/V606/V606i is the master station, the slave station must be V609E/V606e/V606/V606i. Also, depending on the hardware version of the V6 series, multi-link 2 connection may not be supported. Refer to the V6 Hardware Specifications.)

Wiring

Connection

For V7 Series:



(a) Connection between PLC ↔ V7 master station
The communication parameter setting and connecting method are the same as those for 1 : 1 connection.
(Refer to “Chapter 2” to “Chapter 33.”)

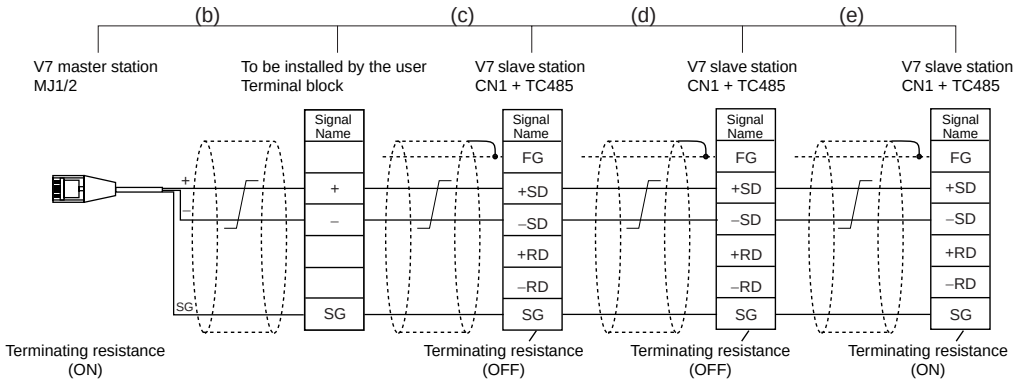
(b)(c) Connection between V7 series master station ↔ V7 slave station
The connecting port for the V7 series master station depends on the selection for [Multi-Link] (either [Modular Jack 1] or [Modular Jack 2]) on the V-SFT editor. Selection of [Modular Jack 2] is recommended. ([Editor Port] is set as default for [Modular Jack 1].)
The connecting port of the V7 series slave station should be CN1. It is recommended that CN1 be equipped with a terminal converter “TC485” (set to 2-wire connection).
The multi-link 2 master cable (b) (V6-MLT) is 3 m long.
If the distance (c) between the V7 series master station and the V7 series slave station is longer than 3 m, use a terminal block and connect the cables.

(d)(e) Connection between V7 series slave station ↔ V7 slave station
Use the RS-485 2-wire connection.
It is recommended that CN1 be equipped with a terminal converter “TC485” (set to 2-wire connection).

(b)(c)(d)(e) The maximum length between V7 series should be 500 m.

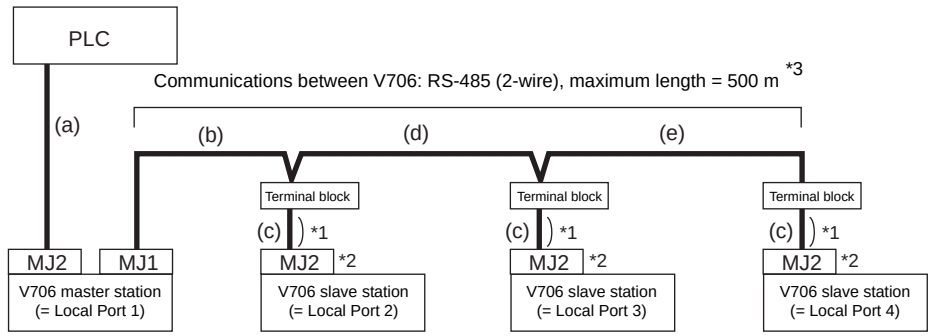
* To avoid line-noise problems, connect one terminal only so that the shielded frame ground of each cable will not be connected between the V7 series.
The shielded frame ground of V6-MLT must be connected to the V7 series master station.

* When the terminal converter “TC485” is not used, install jumpers between +RD/+SD and –RD/–SD.



For V706:

For V706 + DU-01, refer to “For V7 Series:” above.



*1 0.5 m recommended (1.0 m maximum)

*2 Set the slide switches on the V706 slave stations to the upper position: RS-232C/485.

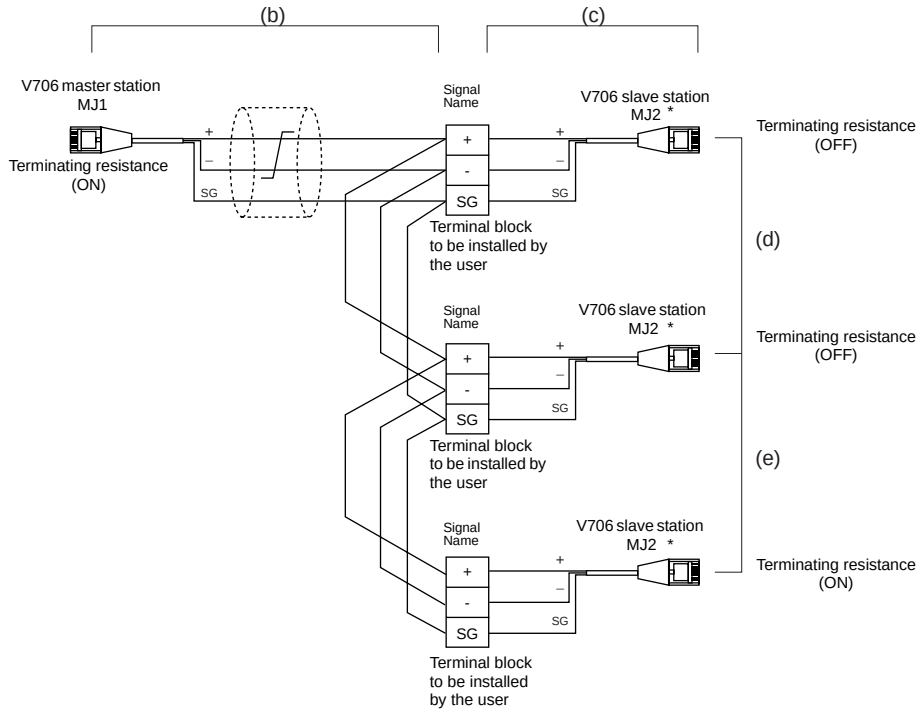
*3 Use twisted-pair cables of 0.3 mm sq. or greater between terminal blocks.

(a) Connection between PLC ↔ V706 master station (MJ2)
The communication parameter setting and connecting method are the same as those for 1 : 1 connection.
(Refer to “Chapter 2” to “Chapter 33.”)

(b) Connection between V706 master station (MJ1) ↔ V706 slave station (MJ2)
The connecting port of the V706 master station should be MJ1. Select [Modular Jack] from the [System Setting] menu. Select [Multi-Link] for [Modular Jack 1].
The multi-link 2 master cable (b) (V6-MLT) is 3 m long.
From the M706 master station, the V6-MLT cable is connected to the terminal block. From the terminal block, cables are routed in the direction of “(c)” and “(d).”

(C) Connection between terminal block ↔ V706 slave station (MJ2)
The connecting port of the V706 slave station should be MJ2.
A V6-MLT cable (3 m long) is used as cable “(c).”
For multi-link 2 connection, it is necessary to change the MJ2 signal connection to 2-wire system. Be sure to set the slide switch on the V706 to the upper position (RS-232C/RS-485).

(d)(e) Connection between terminal blocks
Use the RS-485 2-wire connection.



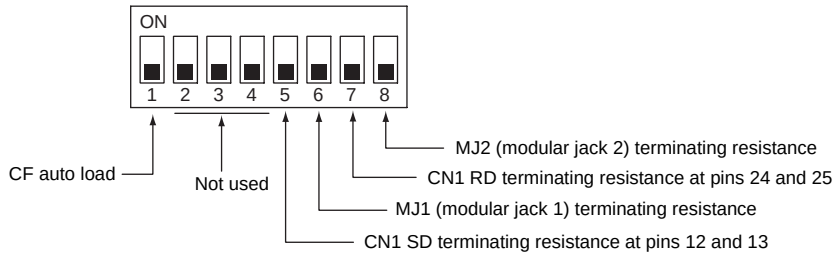
* Set the slide switches on the V706 slave stations to the upper position: RS-232C/485.

(b)(c)(d)(e) The maximum length between V706 should be 500 m.
((d)(e) Twisted pairs of 0.3 mm sq. or above are recommended.)

Terminating Resistance Setting

For V7 Series:

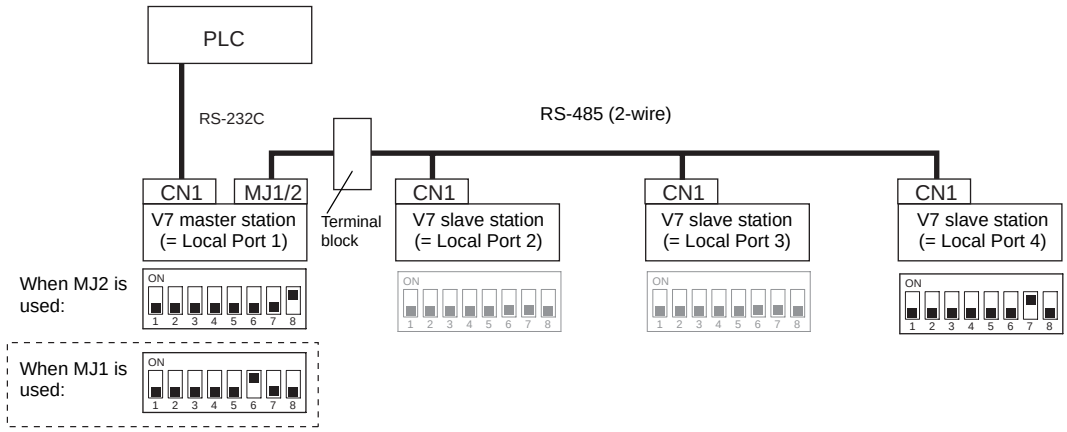
- The terminating resistance of the V7 series should be set on the DIP switch.



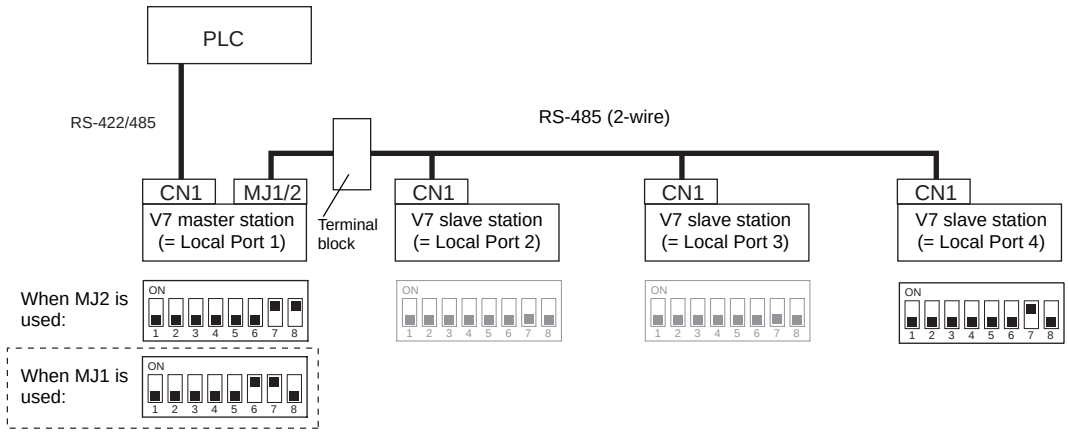
- When the PLC and the master station are connected via RS-422/485, set the terminating resistance at the PLC and the master station (CN1).
- When the V7 series (master and slave stations) are connected via RS-485 (2-wire), set the terminating resistance at the V7 series master station (MJ1/2) and the terminating slave station (CN1).

Terminating Resistance Setting Example

1. When the PLC is connected to V7 series master station via RS-232C:

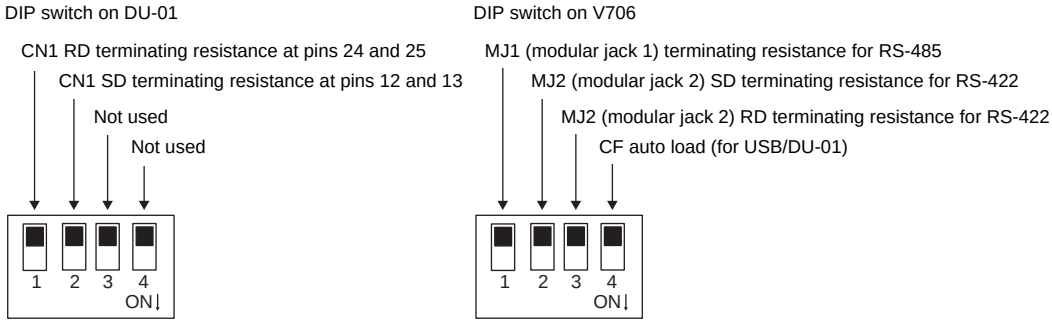


2. When the PLC is connected to V7 series master station via RS-422/485:



For V706 + DU-01

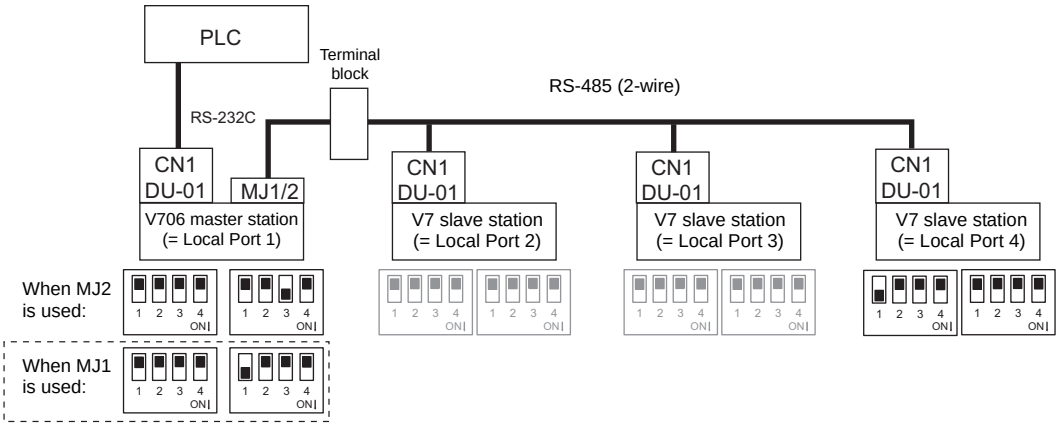
- The DIP switches on the V706 and the option unit DU-01 are used to set the terminating resistances.



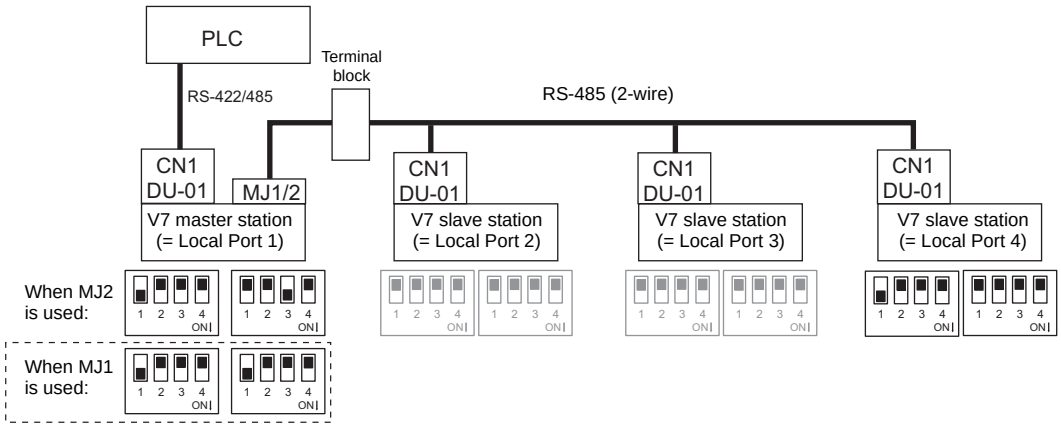
- When the PLC and the master station are connected via RS-422/485, set the terminating resistance at the PLC and the master station (DU-01 CN1).
- When the V7 series (master and slave stations) are connected via RS-485 (2-wire), set the terminating resistance at the V7 series master station (MJ1/2) and the terminating slave station (CN1).

Terminating Resistance Setting Example

1. When the PLC is connected to V706 series master station via RS-232C:

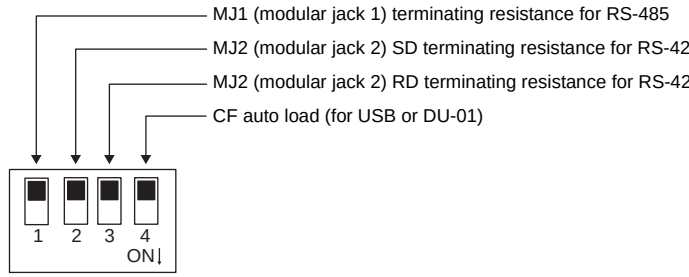


2. When the PLC is connected to V7 series master station via RS-422/485:



For V706:

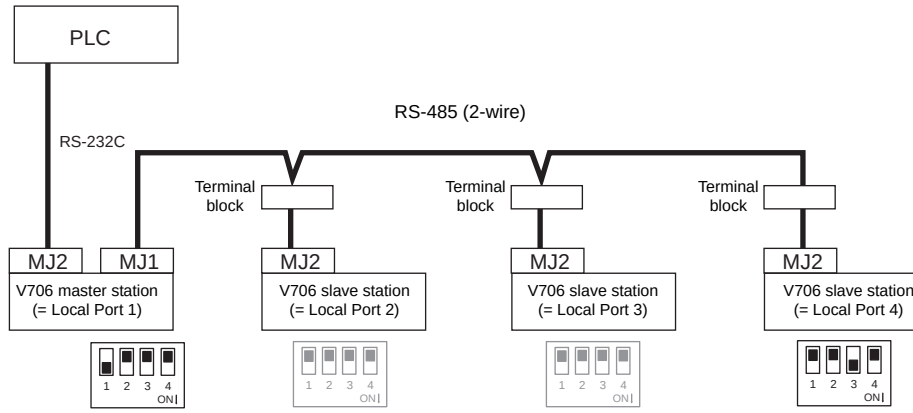
- The terminating resistance of the V706 should be set on the DIP switch.



- When the PLC and the master station are connected via RS-422/485, set the terminating resistance at the PLC and the master station (MJ2).
- When the V706 (master and slave stations) are connected via RS-485 (2-wire), set the terminating resistance at the V706 master station (MJ1) and the terminating slave station (MJ2).

Terminating Resistance Setting Example

1. When the PLC is connected to V706 master station via RS-232C:



V-SFT Setting

The following settings must be made on the V-SFT editor.
Only the points different from those described in “V-SFT Setting (1 : 1 Connection)” (page 1-10) are explained here.

PLC Selection

Select the PLC that is connected.

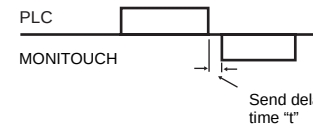
- Setting Procedure
  [System Setting] → [PLC Communication] → [PLC Model] → [PLC Select] dialog →
  Check [◉ Display Models Supporting Multi-Link 2]. The PLC list compatible with multi-link 2 connection is displayed.

Communication Parameter Setting

- Setting Procedure
  [System Setting] → [PLC Communication] → [Communication Parameter] → [Communication Parameters] dialog
- Setting Items
  [Connection]
  Select [Multi-Link 2].
  Click [Setting]. The [Multi-Link 2] dialog is displayed. Make the necessary settings.
  For the V7 series master station, set the following items. For the V7 series slave station, set the items marked with ♦.

  [Local Port No.]♦ (1 to 4)
  Set the port number of the V7 series. For the V7 series master station, set "1." For the V7 series slave station, set "2" to "4."
  Set the unique port number for each V7 series. If the number duplicates, communications will not be performed correctly.

  [Send Delay Time] (0 to 255) (Unit: ×1 msec)
  Set a time delay in sending the response to the PLC after receipt of data from the PLC.
  Normally use the default setting (0).



  [Total]♦ (2 to 4)
  Set the total number of the V7 series included in the multi-link 2 connection.

  [Retry Cycle] (× 10)
  Set the number of cycles before the master station sends an inquiry for restoration to the slave station that has a communication problem (= system down). When a slave station has a problem, it is temporarily removed from the communication targets, and the master station sends an inquiry for restoration every number of cycles specified for [Retry Cycle]. This setting does not affect the communication speed if no problem is occurring; however, if there is any problem, it does affect the communication speed.
  - When the setting value is small: It will not take a long time before restoration.
  - When the setting value is large: It will take a longer time before restoration.

  Supplemental Information:
  [Retrials] in the [Detail] tab window of the [Comm. Parameter] dialog is the number of retrials that the V7 series master station sends an inquiry to the PLC.

  [Multi-Link Baud Rate] ♦ (4800, 9600, 19200, 38400, 57600, 76800, 115k bps)
  Set the baud rate used for communications between the V7 series.
  The setting must be the same as other V7 series on the same communication line.

  * For [Total] and [Baud Rate of Multi-Link], the same values must be set on all the V7 series that are connected in the same communication line.

  * Make the following setting when "1" is set for [Local Port] on the [Comm. Parameter] dialog on the V7 series master station.
  Select [System Setting] → [Modular Jack]. Select [Multi-Link] for [Modular Jack 1] or [Modular Jack 2].
  Connect the multi-link 2 master cable (V6-MLT) to the modular jack selected for [Multi-Link].

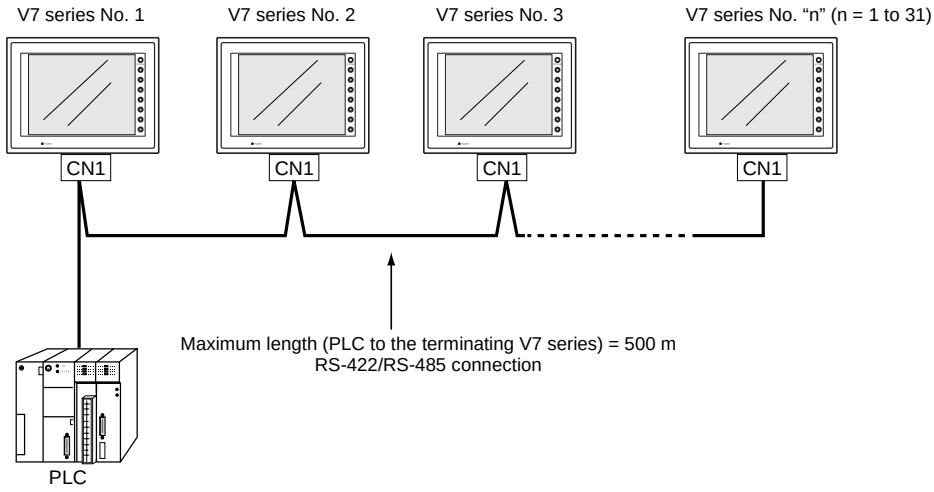
Communication Error

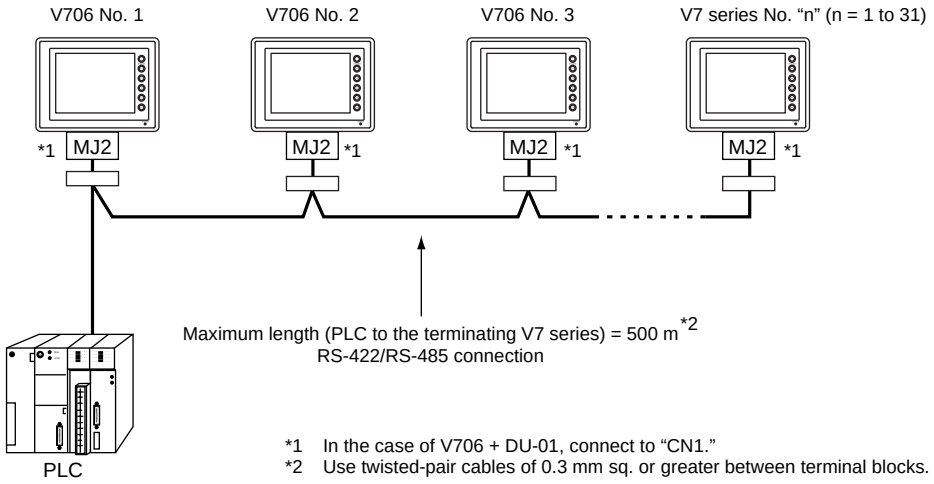
- If the master station has a communication error, the master and slave stations do not work, and as a result, the communication error "Time-out" is displayed.
  If a slave station becomes faulty, the communication error (check) occurs only on this station.

Appendix 3 n : 1 Connection (Multi-link)

Multi-link

- One PLC is connected to multiple V7 series. (Maximum connectable V series: 31)





*1 In the case of V706 + DU-01, connect to "CN1."
*2 Use twisted-pair cables of 0.3 mm sq. or greater between terminal blocks.

- The PLC must be of the type of signal level RS-422/RS-485 with port numbers.
  RS-422 connection between the V7 series ↔ PLC must be in 2-wire connection.
- The V7 and V6 series can be used together.

Wiring

Use the RS-485 2-wire connection.

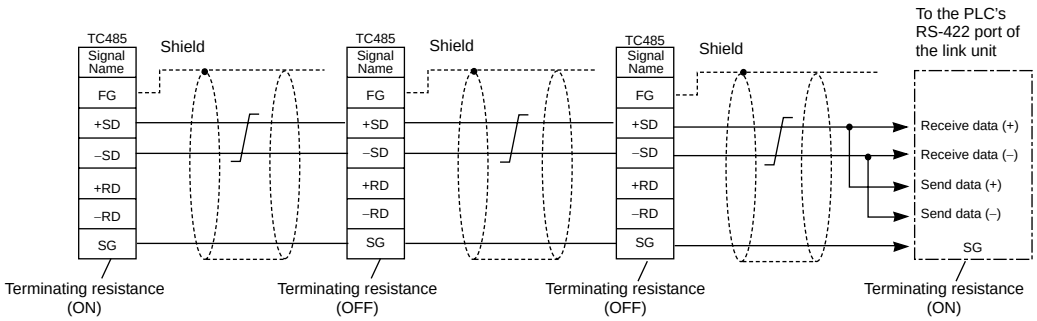
Connection with Link Unit

For V7 Series:

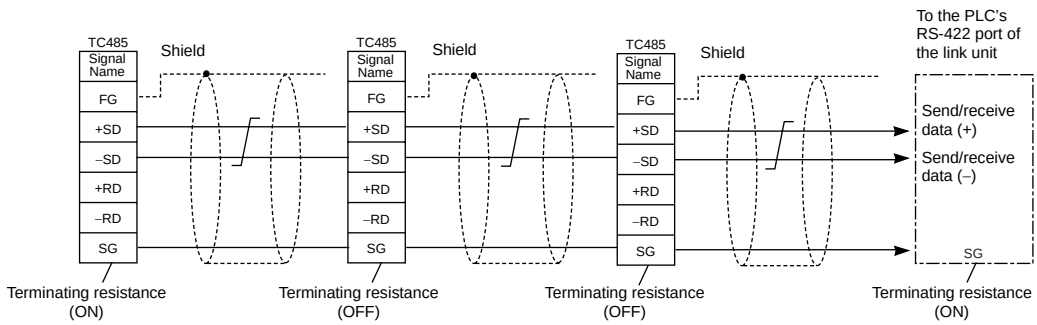
It is recommended that Hakko Electronics' optional terminal converter "TC485" be used.

- When TC485 is used:
  Set "2-wire connection" at the DIP switch (SW1) on TC485.

  When a jumper is required on the PLC:



  When no jumper is required on the PLC:



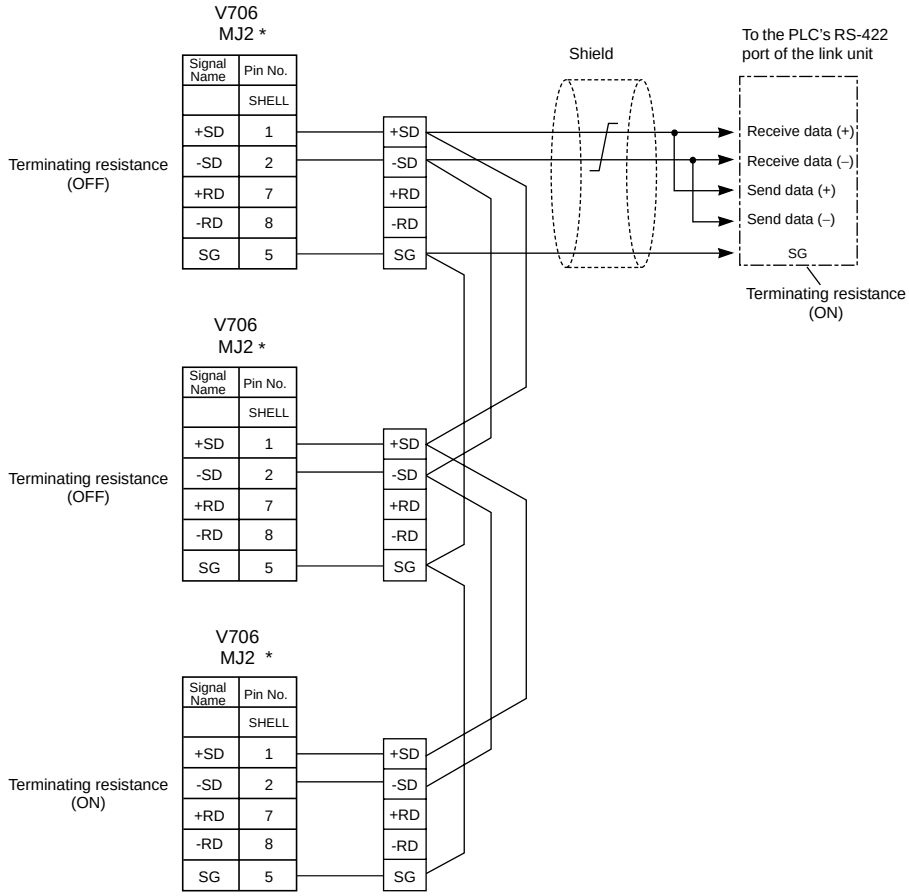
- When TC485 is not used:
  Install jumpers between +RD/+SD and –RD/–SD.

For V706:

For V706 + DU-01, refer to “For V7 Series:” above.

For multi-link connection, it is necessary to change the MJ2 signal connection to 2-wire system. Be sure to set the slide switch on the V706 to the upper position (RS-232C/RS-485).

When a jumper is required on the PLC:



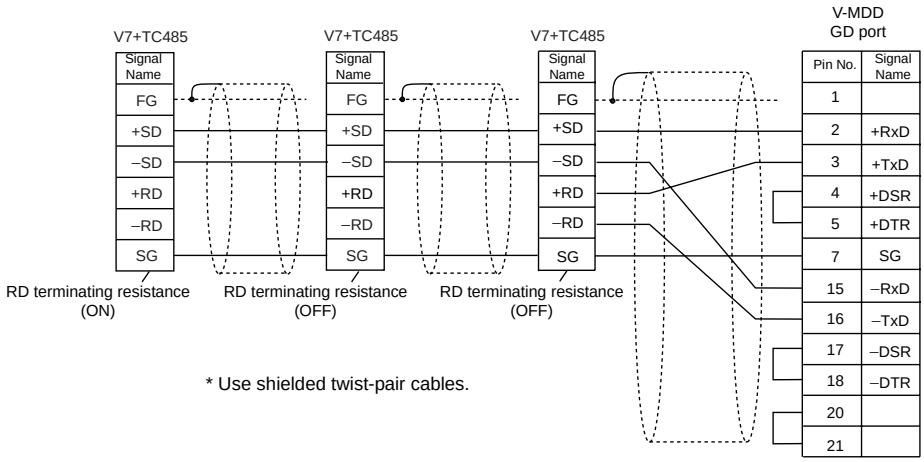
* Slide the slide switch on the V706 to the upper position for RS-232C/485.

When Connecting Directly to the CPU of the MITSUBISHI QnA Series:

Use the GD port of Hakko Electronics' optional dual port interface V-MDD for the PLC CPU port. Also the use of Hakko Electronics' optional terminal converter TC485 is recommended.

For V7 Series:

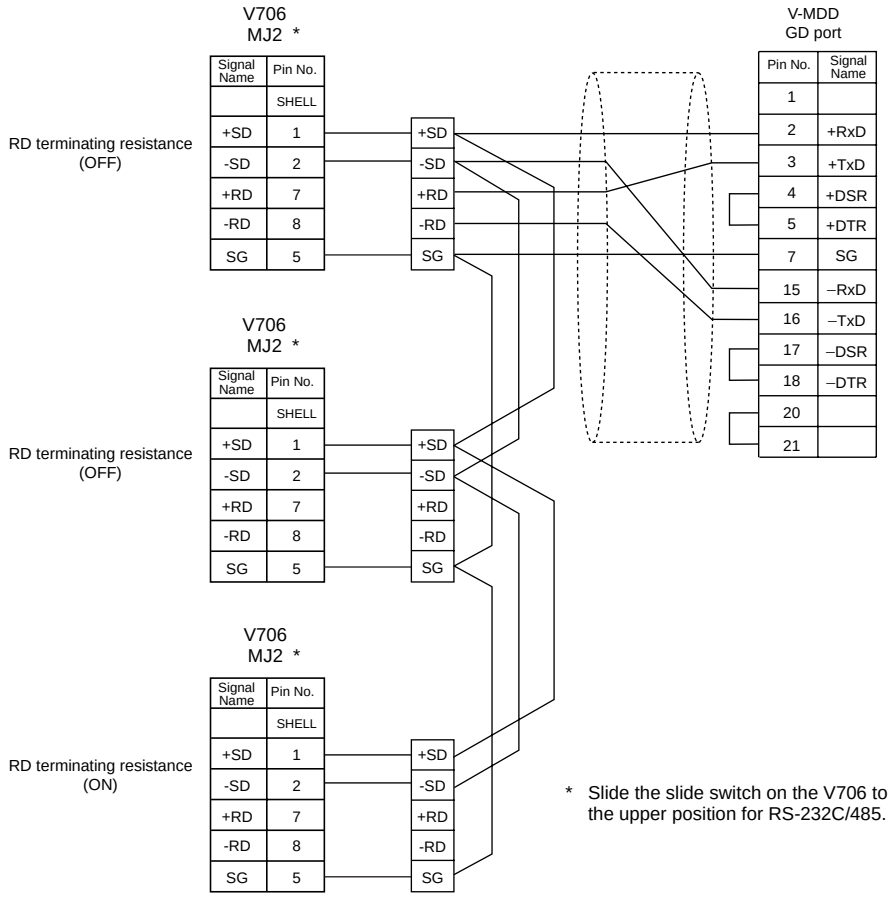
- When TC485 is used:
  Set "2-wire connection" at the DIP switch (SW1) on TC485.



- When TC485 is not used:
  Install jumpers between +RD/+SD and –RD/–SD.

For V706:

For V706 + DU-01, refer to “For V7 Series:” above.



* Slide the slide switch on the V706 to the upper position for RS-232C/485.

V-SFT Setting

The following settings must be made on the V-SFT editor.
Only the points different from those described in “V-SFT Setting (1 : 1 Connection)” (page 1-10) are explained here.

PLC Selection

Select the PLC that is connected. Check that the PLC to be connected is ready for multi-link connection. Refer to “Connection Compatibility List” at the back of this manual.

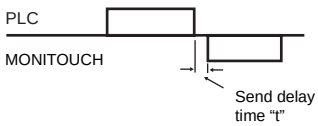
- Setting Procedure
  [System Setting] → [PLC Communication] → [PLC Model] dialog

Communication Parameter Setting

- Setting Procedure
  [System Setting] → [PLC Communication] → [Communication Parameter] dialog
- Setting Items
  [Connection]
  Select [Multi-Link].
  Click [Setting]. The [Multi-Link] dialog is displayed. Make the necessary settings.

  [Local Port No.] (1 to 31)
  Set the port number of the V7 series.
  Set the unique port number for each V7 series. If the number duplicates, communications will not be performed correctly.

  [Send Delay Time] (0 to 255) (Unit: ×1 msec)
  Set a time delay in sending the response to the PLC after receipt of data from the PLC.
  (Default setting: 20 msec)



  [Total] (2 to 31)
  Set the total number of the V7 series included in the connection.

  [Retry Cycle] (× 10)
  When the V7 series has a problem, it is temporarily removed from the communication targets, and the master station sends an inquiry for restoration every number of cycles specified for [Retry Cycle]. This setting does not affect the communication speed if no problem is occurring; however, if there is any problem, it does affect the communication speed.
  - When the setting value is small: It will not take a long time before restoration.
  - When the setting value is large: It will take a longer time before restoration.

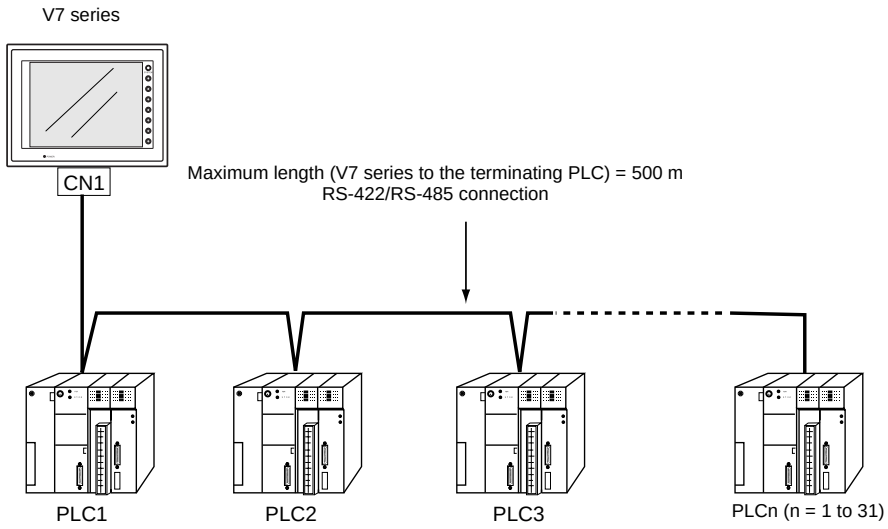
  Supplemental Information:
  [Retrials] in the [Detail] tab window of the [Comm. Parameter] dialog is the number of retrials that the V7 series sends an inquiry to the PLC.

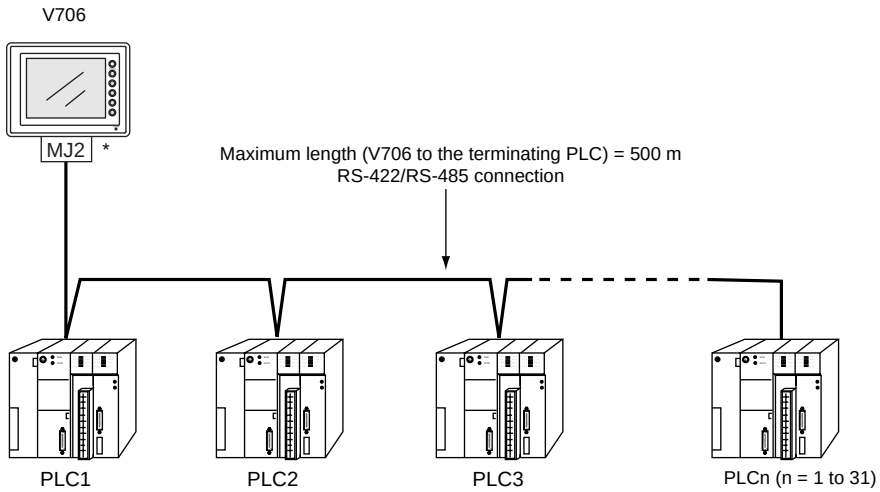
* For [Send Delay Time], [Total] and [Retry Cycle], the same values must be set on all the V7 series that are connected in the same communication line.

Appendix 4 1 : n Connection (Multi-drop)

1 : n Connection

One V7 series is connected to multiple PLCs. (Maximum connectable PLCs: 31)



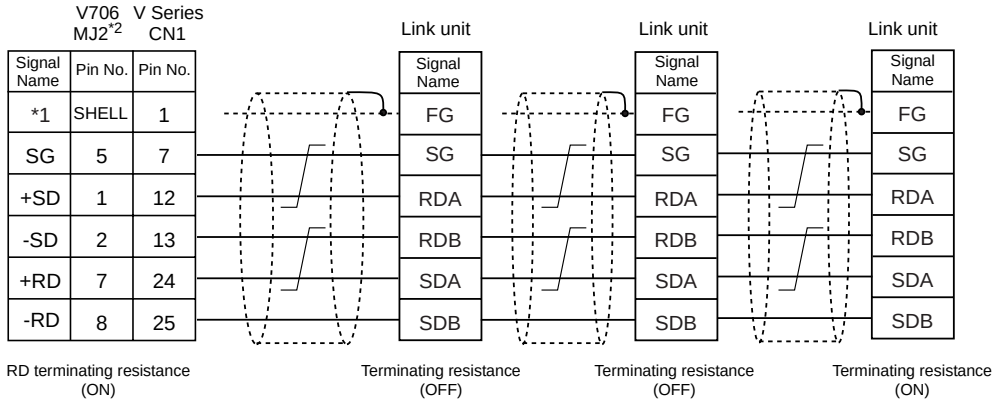


* In the case of V706 + DU-01, connect to “CN1.”

Wiring (RS-422/485)

For connecting information, refer to the instruction manual for the PLC.
Example:

The following example shows how one V7 series is connected to three PLCs made by MITSUBISHI.
For more information, refer to MITSUBISHI's instruction manual for the PLC.



*1 Pin No. 1 of CN1 is used as FG.
The metal shell of the modular jack 2 on the V706 is used as SG.

*2 Slide the slide switch on the V706 to the lower position for RS-422.

* Use shielded twist-pair cables.

V-SFT Setting

The following settings must be made on the V-SFT editor.
Only the points different from those described in "V-SFT Setting (1 : 1 Connection)" (page 1-10) are explained here.

PLC Selection

Select the PLC that is connected. Check that the PLC to be connected is ready for 1 : n connection. Refer to the "Appendix."

- Setting Procedure
  [System Setting] → [PLC Communication] → [PLC Model] dialog

Communication Parameter Setting

- Setting Procedure
  [System Setting] → [PLC Communication] → [Communication Parameters] dialog
- Setting Items
  Select "1 : n" for [Connection].

PLC Port Setting

Set the port number of each PLC not in the [Communication Parameters] dialog but in the [Memory Setting] dialog for each part.

Notes on Communication Errors

Processing for PLC Failure

- If a communication error/timeout is detected during communications with a PLC, the PLC failure information is stored in internal system memory addresses $s 114 to 129 of the V7. No further communication with the PLC is attempted until a macro command is executed or the display screen changes.
  If a communication error/timeout is detected while accessing the [Read Area], the error is processed in the same manner as for 1 : 1 connection.

Supplemental Information: Internal system memory The internal system memory is the one for the V7 series system.

- Using the macro command RECONNECT, communications can be resumed without the display screen change.

[RECONNECT]

In the case of a multi-drop connection, communication with the port (specified with “F0”) that caused the failure is resumed once.

Usable Devices

	Internal Memory	PLC Memory	Constant	Memory Card	Indirect Designation
F0	○		○		

RECONNECT F0

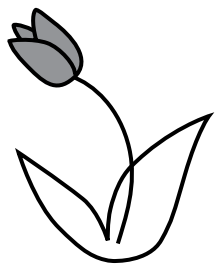
F0	0 to 255	Resumes communication with the desired port.
	−1	Resumes communication with all ports.

When communication is resumed, the failure information is cleared from the system memory ($s114 to 129).

With Internal Memory Set For [Read Area], [Write Area], and [Calendar]

- In the case that the internal memory is set for [Read Area], [Write Area] and [Calendar], no initial connection check is performed, and calendar information is read when the V7 series establishes communications with the PLC for the first time. A communication error does not occur on the V7 series if a timeout is detected while accessing to the PLC.

MEMO

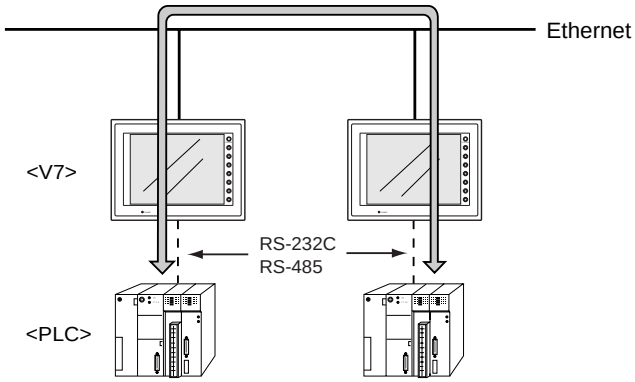


Please use this page freely.

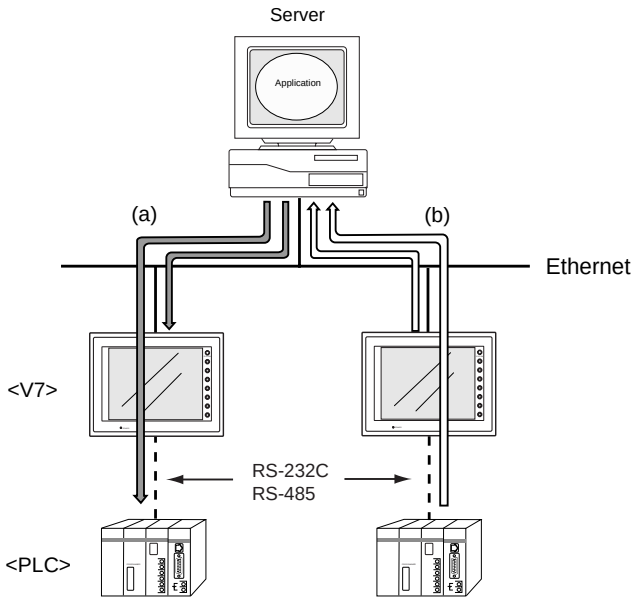
Appendix 5 Ethernet

Ethernet

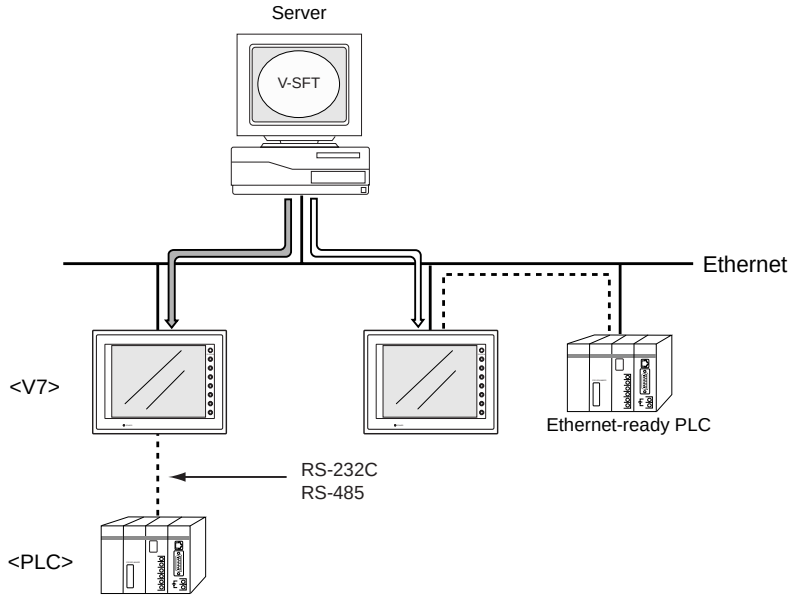
- Transferring data in memory
  Data in memory can be transferred to the V7 series on the Ethernet or to the PLCs linked to the V7 series as a host by using macro commands (EREAD/EWRITE).



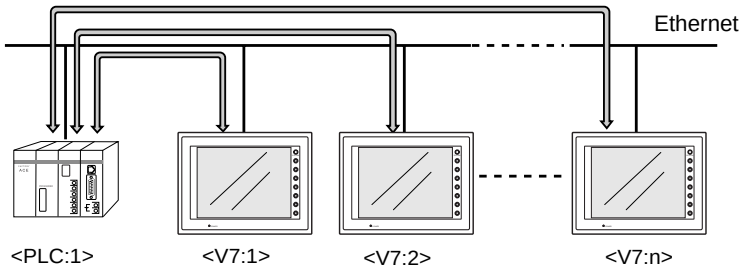
- Communications between the server and the V7 series
  - "HKEtn10.dll" (for UDP/IP protocol) is provided so that the user can create an original application by using Visual C++ or Visual Basic, etc. to allow the server to access the memory device, such as V7 internal memory, memory card or the PLC memory linked with the V7 series as a host..... (a)
  - The macro command (SEND) enables the V7 series to access the server..... (b)



- Screen data can be transferred from the V-SFT editor on the server to the V7 series.

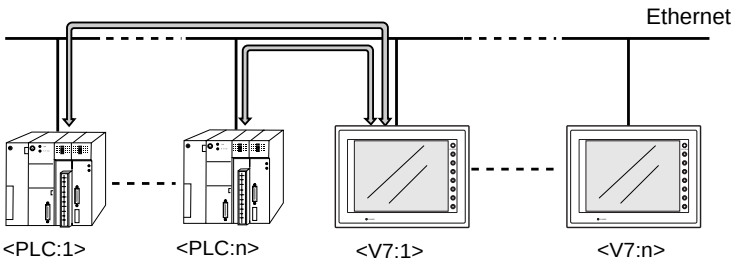


- Communications between the Ethernet-ready PLC and the V7 series
  - The MONITOUCH can communicate with the PLC on the Ethernet.



* Ethernet-ready PLC only

  - The MONITOUCH can communicate with multiple PLCs on the Ethernet.



* Ethernet-ready PLC only

LAN Port Specifications

For V7i:

- To use Ethernet communications on V7i, use the LAN connector provided on the unit.
  It is not possible to use Ethernet or FL-net (OPCN-2) communications by attaching the communication I/F unit CU-03-2 to V7i at the same time.
  When CU-03-2 is mounted, the LAN connector provided on the unit cannot be used.
- When using Ethernet communications with CU-03-2 mounted, the Web server or e-mail function cannot be used.

LAN Specifications

Item	Specifications	
	10BASE-T	100BASE-TX*2
Baud rate	10 Mbps	100 Mbps
Transmission method	Base band	
Maximum network distance or maximum node interval	500 m (Cascade 4-stage)	200 m (Cascade 2-stage)
Maximum segment length	100 m (between the node and the HUB)	
Connecting cable	UTP (unshielded twisted pair) 22-26AWG	
Protocol	UDP/IP, TCP/IP*1	

*1 For connection with some PLCs
*2 It is available with SYSTEM PROG. Ver. 1.470 (V-SFT Ver. 2.2.25.0) and later.

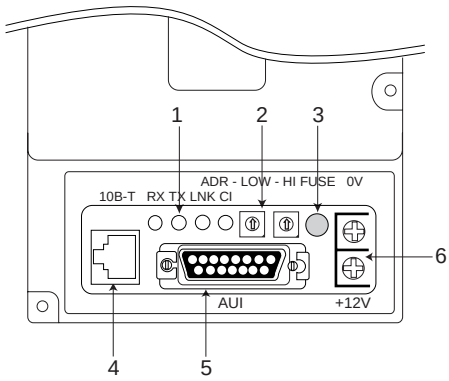
For V7:

- To use Ethernet communications on V7, the communication interface unit “CU-03-2” must be mounted.
  In this case, however, the Web server or e-mail function is not available.

Specifications of Communication Interface Unit CU-03

Item	Specifications		
	AUI		10BASE-T
	10BASE5	10BASE2	
Baud rate	10 Mbps		
Transmission method	Base band		
Maximum network distance or maximum node interval	2500 m (5 segments)	925 m (5 segments)	500 m (Cascade 4-stage)
Maximum segment length	500 m	185 m	100 m (between the node and the HUB)
Maximum number of nodes	100/segment	30/segment	2/segment
Minimum node interval	2.5 m	0.5 m	-
Connecting cable	Ethernet coaxial cable (50 Ω)	RG58A/U, RG58C/U coaxial cable (50 Ω)	UTP (unshielded twisted pair) 22-26AWG
Protocol	UDP/IP		

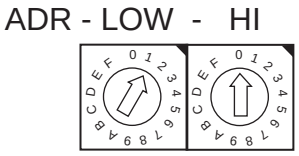
Names and Functions of Components



1. LED
   Indicates the status of the communication.

Name	Contents	On	Off
RX	Data receive status	Currently receiving	Not receiving
TX	Data send status	Currently sending	Not sending
LNK	Link status (for 10BASE-T only)	Normal	Error
CI	Collision	Data collision	Normal

2. Port number setting switches
   Set the port number of V7 specified on the network table using the following rotary switches.
   Example: To set port No. 1:



* Make sure that each I/F unit on the network has a unique port number.

3. Fuse
   This is the fuse for 12 VDC power supply. (Rating 2 A)

4. 10BASE-T connector
   This connector is used for 10BASE-T connection. (Compliant with IEEE802.3)

5. AUI connector
   This connector is used for connecting the transceiver cable in the case of 10BASE2 or 10BASE5.

6. 12 VDC power supply terminal
   The power source is required for the transceiver of AUI connection.
   Be sure to take account of a voltage drop at CU-03-2 (max. 0.7 V).

   * It is not necessary to use 10BASE-T.

For V706:

- To use Ethernet communications with the V706, an optional unit, DU-01, is necessary. Web server and e-mail functions are available.

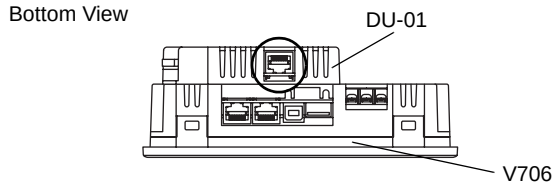
Specifications of Option Unit DU-01

Item	Specifications	
	10BASE-T	100BASE-TX*2
Baud rate	10 Mbps	100 Mbps
Transmission method	Base band	
Maximum network distance or maximum node interval	500 m (Cascade 4-stage)	200 m (Cascade 2-stage)
Maximum segment length	100 m (between the node and the HUB)	
Connecting cable	UTP (unshielded twisted pair) 22-26AWG	
Protocol	UDP/IP, TCP/IP*1	

*1 For connection with some PLCs
*2 It is available with SYSTEM PROG. Ver. 1.470 (V-SFT Ver. 2.2.25.0) and later.

Port Position

When the DU-01 mounted on the V706, the LAN port faces downward.



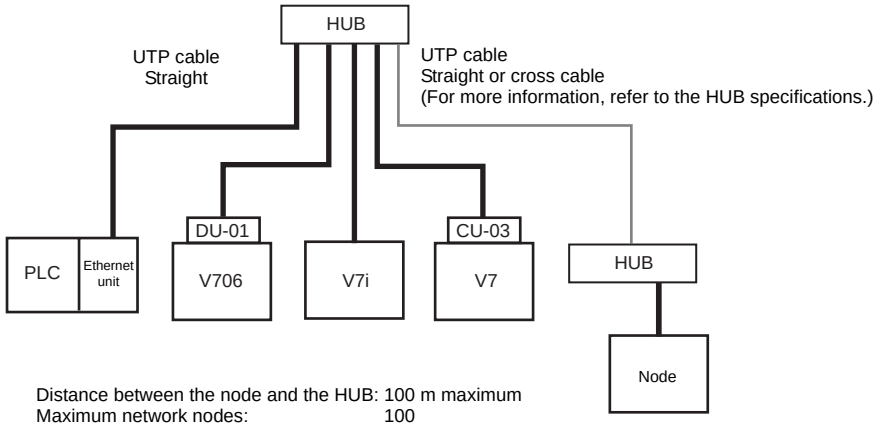
IP Address for the V7 Series

To enable Ethernet communications on the V7 series, it is necessary to set the IP address for identification of the V7 series on the network.
For more information on the IP address setting for V7 series, refer to the Reference Manual.
For V706, refer to the V706 Hardware Specifications.

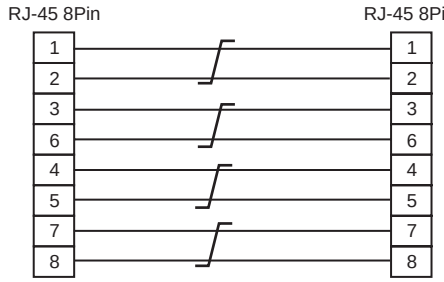
Wiring

10BASE-T/100BASE-TX Connection

- Cable connection diagram

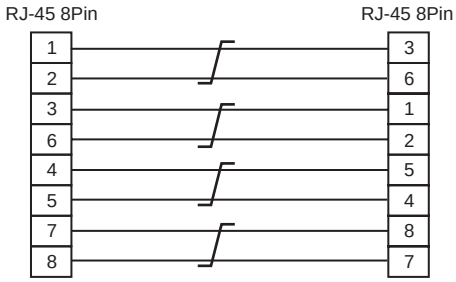


Straight cable
(with HUB)



* Unshielded twist-pair cable

Cross cable
(without HUB)



* Unshielded twist-pair cable

- Notes on cables
  Use the following recommended cable.

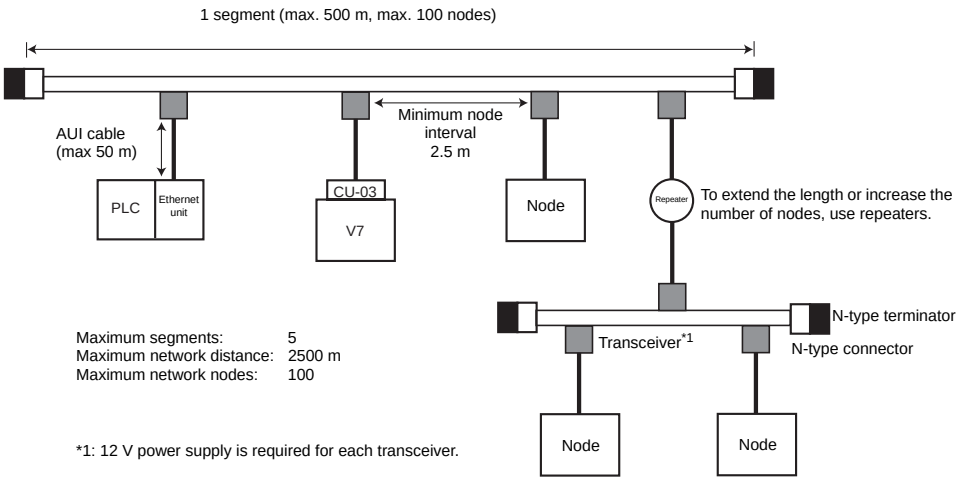
Recommended cable	10BASE-T/100BASE-TX	Type: Twist-pair cable, category 5

AUI Connection

10BASE5

The following devices are required for 10BASE5 connection:

- Coaxial cable for 10BASE5
- AUI cable
- N-type connector
- N-type terminator
- Transceiver
- Power supply for the transceiver: 12 VDC



- Transceiver
  Use the transceiver equipped with the SQE TEST function.
  (SQE TEST : Signal Quality Error Test)

  Recommended transceiver

Manufacturer	Type
Allied Telesis	CentreCOM 107

* The I/F unit may be broken if the AUI connector is subject to strong force. Use the AUI cable when connecting the transceiver.

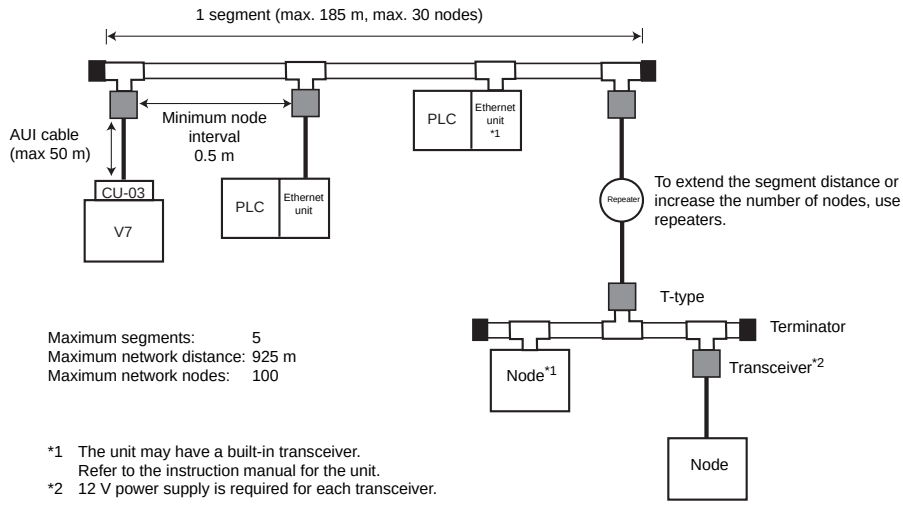
* When the power lamp of the transceiver is not turned on, check the wiring of 12 VDC power supply, then replace the fuse (refer to page App5-4) of the I/F unit CU-03-2.
For the replacement procedure, refer to the manual “CU-03-2 OPERATING INSTRUCTIONS,” attached to CU-03-2.

10BASE2

The following devices are required for 10BASE2 connection:

- Coaxial cable for 10BASE2
- AUI cable
- T-type adaptor
- Terminator for 10BASE2
- Transceiver
- Power supply for the transceiver: 12 VDC

- Transceiver



*1 The unit may have a built-in transceiver.
Refer to the instruction manual for the unit.
*2 12 V power supply is required for each transceiver.

Use the transceiver equipped with the SQE TEST function.
(SQE TEST: Signal Quality Error Test)

Recommended transceiver

Manufacturer	Type
Allied Telesis	CentreCOM 107

* The I/F unit may be broken if the AUI connector is subject to strong force. Use the AUI cable when connecting the transceiver.

* When the power lamp of the transceiver is not turned on, check the wiring of 12 VDC power supply, then replace the fuse (refer to page App5-4) of the I/F unit CU-03-2.
For the replacement procedure, refer to the manual “CU-03-2 OPERATING INSTRUCTIONS,” attached to CU-03-2.

Transferring Screen Data

This section describes the procedure for transferring screen data from the V-SFT editor on the server to MONITOUCH via Ethernet.
For the procedure using the V6-CP cable, refer to the Transfer Procedure 4.4 (Using a Communication Cable) in the Introductory Manual.

Prerequisites

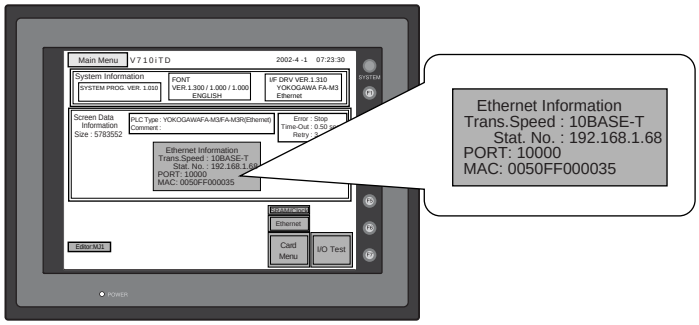
When screen data is to be transferred for the first time via Ethernet or when the V7 series has been replaced due to trouble, the server cannot transfer screen data because the network table has not been transferred to the V7 series.
In this case, the following setting must be made on the Main Menu screen:

- IP address
- Default gateway
- Subnet mask

The port number must be “10000.”
When the network table is transferred from the V-SFT editor, the above data is updated.

- Setting Procedure

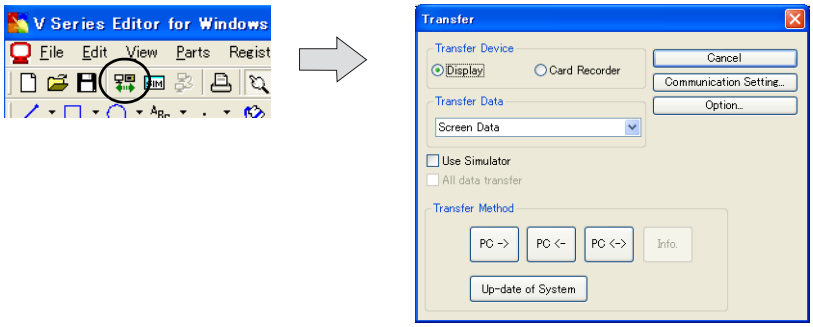
1. Press the [Ethernet] switch on the Main Menu screen.
2. The Ethernet screen is displayed. (For more information, refer to “Chapter 6, MONITOUCH Operations” in the V7 Hardware Specifications Manual or V706 Hardware Specifications Manual.)
   Set the IP address. If necessary, set the default gateway and subnet mask.
   (When attaching the I/F unit CU-03-2 to V7, set the connecting method (10BASE-T/AUI) as well.)
3. When the setting has been completed, press the [Setting Finished] switch. The Main Menu screen is displayed again.
4. The setting data can be reviewed on the Main Menu screen.



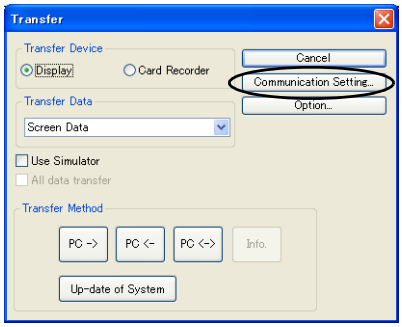
5. Transfer screen data from the server.

Transferring Screen Data from V-SFT Editor

1. Click the [Transfer] icon. The [Transfer] dialog is displayed.

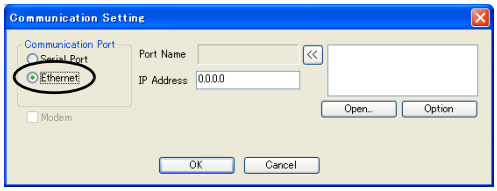


2. Click the [Communication Setting] button.

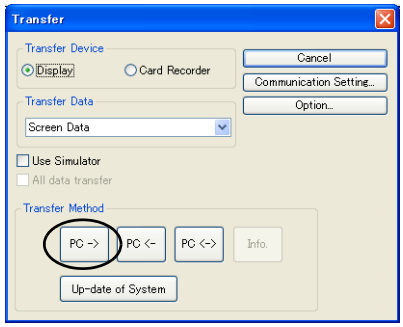


3. The [Communication Setting] dialog is displayed.
   Enter the IP address of the V7 series to which the screen data is to be transferred.

   When a list is shown, select the IP address of the V7 series, and click the [<<] button. The host name and the IP address are automatically entered.
   Click [OK].



4. Click [PC->]. Data transfer is started.



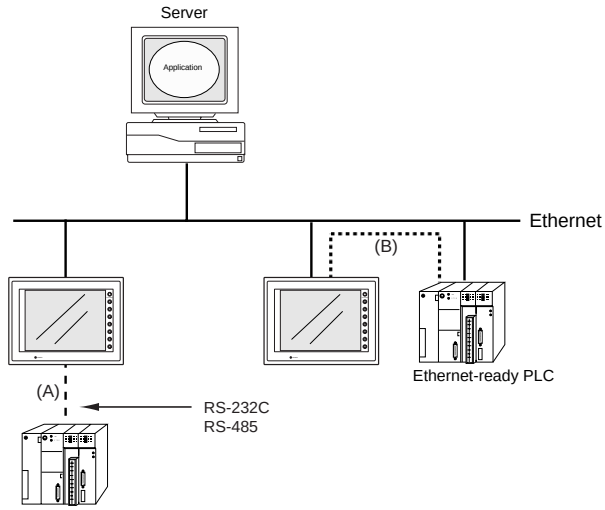
V-SFT Setting: PLC Model/Communication Parameter

To enable Ethernet communications between the V7 series and a PLC, the following setting is required on the V-SFT editor.

- PLC Model setting
- Communication parameter setting
- Network table editing

In this section, the PLC model setting and communication parameter setting are explained.

Connection Example

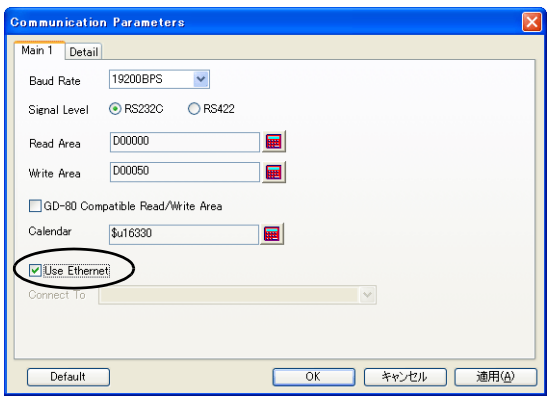


There are two connecting methods between the V7 series and the PLC.
(A) Connecting to the PLC through RS-232C or RS-485 interface
(B) Connecting to the PLC on the Ethernet

The contents of the system setting vary depending on the method selected.
Check the connecting method and make the setting on the V-SFT editor.

(A) Connecting to the PLC through RS-232C or RS-485 interface

1. PLC type setting
   Select [System Setting] → [PLC Communication] → [PLC Model] and select the PLC to be used.
2. Communication parameter setting
   Select [System Setting] → [PLC Communication] → [Communication Parameter]. Attach a check mark (☑) to [Use Ethernet].
3. Select [System Setting] → [Ethernet Communication] → [Network Table]. The network table edit window is displayed. Edit the network table. For more information on network table editing, refer to page App5-16.



(B) Connecting to the PLC on the Ethernet

1. PLC type setting
   Select [System Setting] → [PLC Communication] → [PLC Model] and select the PLC that shows [xxxxx (Ethernet XXXXX)].
   At present (Oct, 2006), the following PLC models are supported.

Manufacturer	Select PLC Type	PLC	Unit	Port No. (DEC)	TCP/IP UDP/IP
ALLEN-BRADLEY	PLC-5 (Ethernet)	PLC-5	PLC-5/20E PLC-5/40E PLC-5/80E	44818 fixed	TCP/IP*1
	SLC500 (Ethernet)	SLC 5/05	1747-L-551 1747-L-552 1747-L-553		
	NET-ENI (SLC500)	SLC500	NET-ENI		
	Control Logix (Ethernet)	Control Logix	1756-ENET-A 1756-ENBT-A		
Hitachi	HIDIC-H (Ethernet)	H series	LAN-ETH2	3004 - 3005	UDP/IP
		EH-150	EH-ETH	3004 - 3007	
		EH-WD10DR EH-WA23DR	-	3004 - 3007	
	HIDIC-EHV (Ethernet)	EHV series	-	3004 - 3007	
	HIDIC-S10/2α, S10mini (Ethernet)	S10 2α S10 mini	LQE020	4301 fixed	TCP/IP*1
	HIDEIC-S10V (Ethernet)	S10V	LQE520	4302 fixed	
			LQP520	4302 - 4305 fixed	
KEYENCE	KV-700 (Ethernet UDP/IP)	KV-700	KV-LE20	8501	UDP/IP
	KV-700 (Ethernet TCP/IP)			8500	TCP/IP*1
	KV-1000 (Ethernet TCP/IP)	KV-1000		8500	
LS	MASTER-K series (Ethernet)	K3P-07AS	G6L-EUTB	2005 fixed	UDP/IP
	GLOFA GM series (Ethernet)	GM6-CPUA			
	GLOFA GMR series (Ethernet)	GMR-CPUA GMR-CPUB	G3L-EUTB G3L-EUFB G3L-EU5B		
	XGT/XGK series (Ethernet)	XGT-CPUH XGK-CPUH	XGL-EFMF XGL-EFMT		
Matsushita Electric Works	FP series (Ethernet TCP/IP)	FP2	FP2-ET1	0	TCP/IP*1
	FP series (Ethernet UDP/IP)			0	UDP/IP
MITSUBISHI ELECTRIC	QnA series (Ethernet)	Q2A, Q3A, Q4A, Q2ASx	AJ71QE71 AJ71QE71-B5 A1SJ71QE71-B2 A1SJ71QE71-B5	5000	
	QnH (Q) series (Ethernet)	QnH (Q mode)	QJ71E71 QJ71E71-B2 QJ71E71-100	5000*2	
	QnH (Q) series (Multi CPU) (Ethernet)				

Manufacturer	Select PLC Type	PLC	Unit	Port No. (DEC)	TCP/IP UDP/IP
OMRON	SYSMAC CS1/CJ1 (Ethernet)	CS1 CJ1	CS1W-ETN01 CJ1W-ETN11	9600	UDP/IP
	SYSMAC CS1/CJ1 (Ethernet Auto)			9600	
	SYSMAC CS1/CJ1 DNA (Ethernet)			9600	
SHARP	JW series (Ethernet)	JW20H/30H	JW255CM JW25TCM	0	
	JW311/312/321/322 series (Ethernet)	JW300 series		0	
	JW311/332/341/342/ 352/362 series (Ethernet)	JW300 series		0	
SIEMENS	S7-300/400 (Ethernet)	CPU313C-2 DP CPU315-2 CPU317-2 DP	CP343-1 Lean	102 fixed	TCP/IP*1
		CPU412-2 CPU416-2	CP443-1		
TOSHIBA	T series/V series (T compatible) (Ethernet)	T2N PU235N	-		UDP/IP
		S3PU45A S3PU55A S3PU65A	EN771/721/731/741/751/751A/761	1024 - 65535 (exept for 10000, 48000)	
Toyoda Machine Works	TOYOPUC (Ethernet)	L2/PC2 series PC3J	FL/ET-T-V2	6000	
Yaskawa	MP2300 (MODBUS TCP/IP)	MP2300	218IF-01	10000 (256 - 65535)	TCP/IP*1
Yokogawa Electric	FA-M3/FA-M3 R (Ethernet)	FA-M3 FA-M3 R	F3LE01-5T F3LE11-0T	12289 fixed	UDP/IP
			SP66-4S SP67-4S	12289, 12291 fixed	
–	MODBUS TCP/IP (Ethernet)	(adapted to MODBUS TCP/IP)	(adapted to MODBUS TCP/IP)	502	TCP/IP*1

*1 Adapted to the V7i-series built-in LAN port and V706 + DU-01, and not to CU-03-2.
The number of the maximum connections in the V7 series is 8. One V7 can be connected to 8 PLCs simultaneously in 1:n connection.
The number of the maximum V7 series is defferent according to the specification of PLC in n:1 connection. Refer to each PLC's manual.

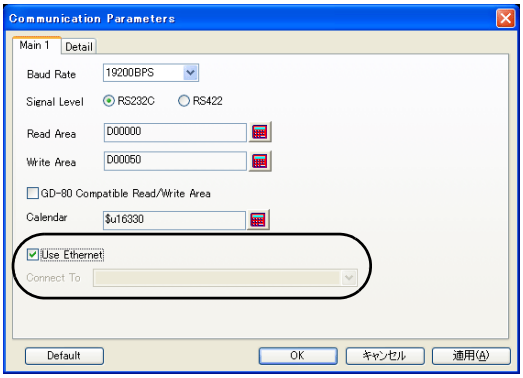
*2 Default when the automatic open UDP port is in use
If the open setting on the ladder tool software is used, the port number specified for the open setting takes effect.

2. The memory use is the same as the one for 1 : 1 connection. (Refer to "Chapter 2" to "Chapter 33.")

* The data code of the V7 series is fixed to the binary code.
Be sure to set the binary code for the data code on the PLC.

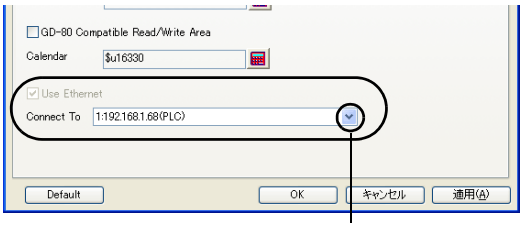
3. Communication parameter setting
   - Select [System Setting] → [PLC Communication] → [Communication Parameter].
     Set the PLC to the V7 series which is connected.

     When the network table is not set:
     Network table No. 0 is displayed.
     It is not possible to select an option for [Connect To]. Select [System Setting] → [Ethernet Communication] → [Network Table]. The [Network Table Edit] window is displayed.
     Set the network table, and then go back to the communication parameter setting.
     For more information on network table editing, refer to page App5-16.



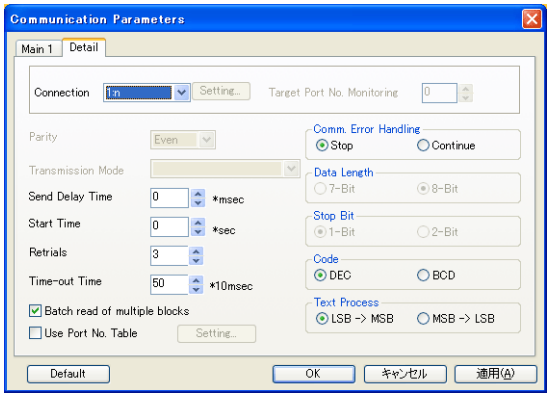
When the network table is set:

The IP addresses that are set on the network table are displayed.
Select the IP address of the desired PLC.



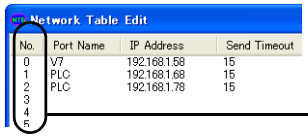
Click here. A drop-down list is displayed.

- When communicating with multiple PLCs (same model) on the Ethernet, select [1 : n] for [Connection] on the [Detail] tab window.

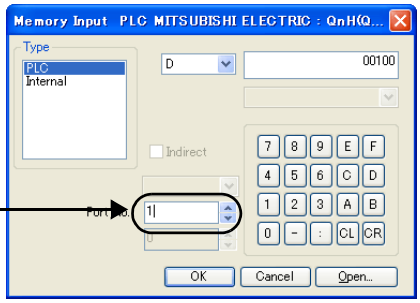


Set the port number (network table number) of the PLC in the [Memory Input] dialog for each part. For more information on the network table, refer to page App5-16.

[Edit Network Table]



[Memory Input]

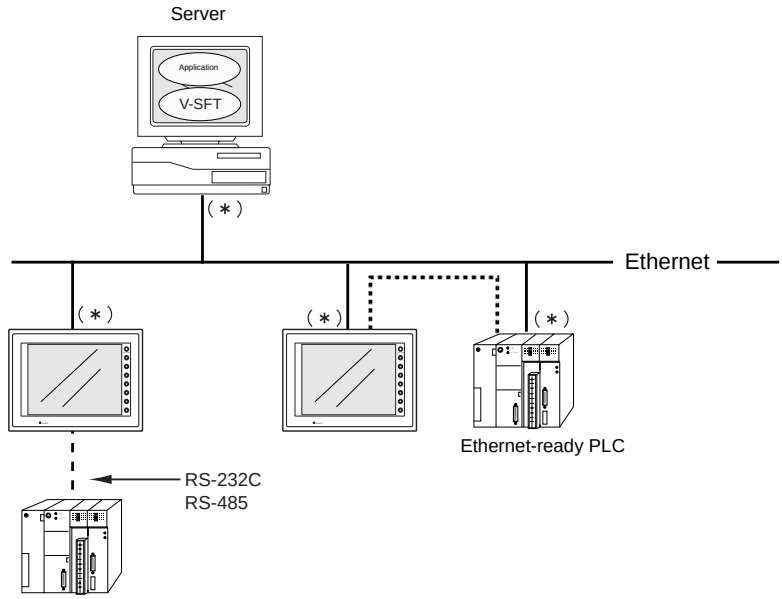


V-SFT Setting: Network Table Editing

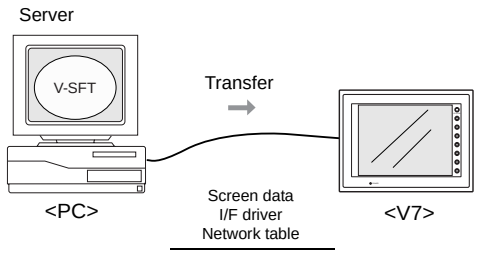
To enable Ethernet communications on the V7 series, the following network table setting is required on the V-SFT editor.

Network table

- The V7 series, PLCs and PCs on the Ethernet must be registered on the network table.
  In the case of the network illustrated below, the nodes with (*) should be registered on the network table.



- The network table is transferred to the V7 series together with screen data.



Starting and Closing

- Starting
  Select [System Setting] → [Ethernet Communication] → [Network Table]. The network table edit window is displayed.

[Close] button

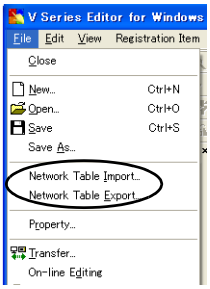
- Closing
  Select [File] → [Exit], or click the [Close] button.

Menu and Icons

Each menu item corresponds to the icons as shown below.

[File] menu

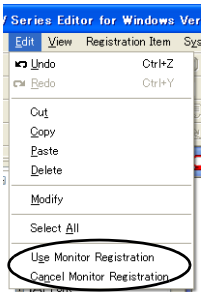
- Import Network Table
  Imports a network table saved as a file "∗.ntb."
- Export Network Table
  Exports a network table as a file "∗.ntb."

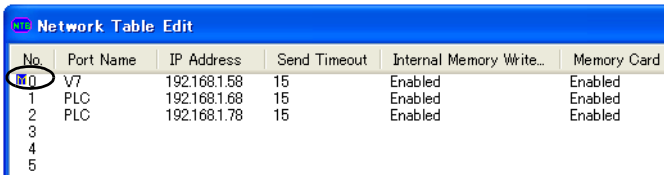


[Edit] menu

- Use Monitor Registration
  Only one V7 series can be registered as the monitor for Ethernet communications.

  A mark is shown on the left of the network table number.

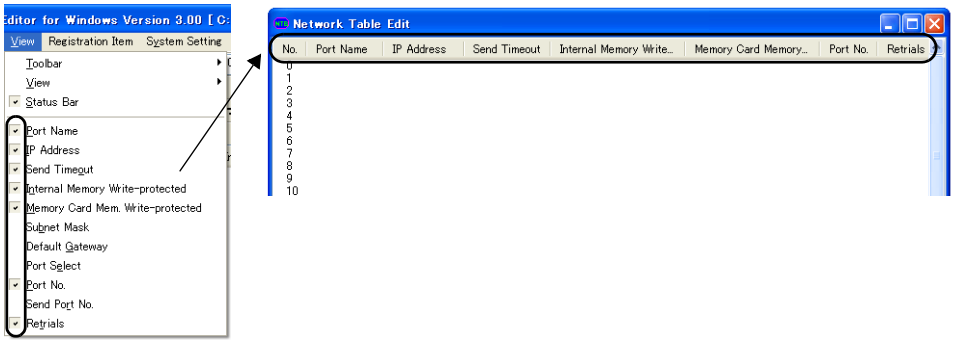




- Cancel Monitor Registration
  Click this menu when canceling monitor registration.

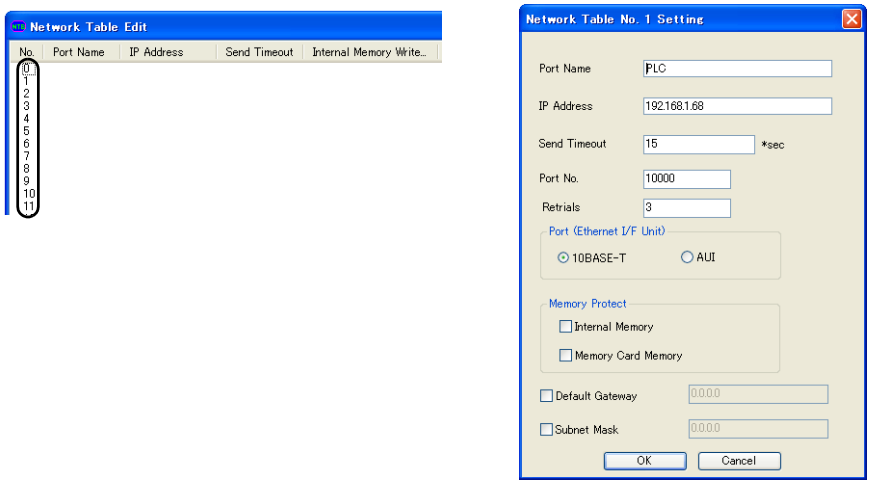
[View] menu

The items with a check mark are shown on the network table editing window.



Editing the Network Table

Double-click the number.
The [Set Network Table No. *] dialog is displayed.



[Host Name]

Set the name for the V7 series, etc. to be used on the Ethernet.

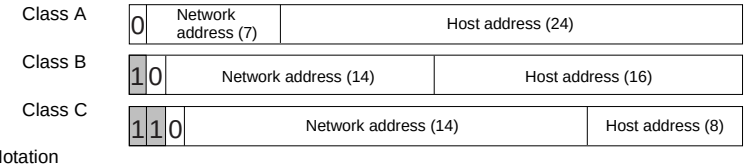
[IP Address]

Set the IP address.

* When registering Ethernet-ready PLC, set the same IP address as that of the PLC.
  For the setting procedure of the IP address on the PLC, see the manual attached to each PLC.
* When registering a computer as the server, set the same IP address as that of the computer.
  When setting the IP address on the computer, open [Property] of [TCP/IP] in [Network] on the Windows.
* To connect to the intra-company network, consult with the network administrator.

IP Address

This is an address that is used for recognizing each node on the Ethernet and should be unique.
The IP address is 32-bit data which consists of the network address and the host address and can be classified into A to C depending on the network size.



Notation

A string of 32-bit data is divided into four, and each segment delimited with a period is in decimal notation.
Example: The IP address in class C shown below is represented as "192.128.1.50."
11000000 10000000 00000001 00110010

Unusable IP addresses:

- "0" is specified for one byte at the extreme left. Example: 0.x.x.x
- "127" is specified for one byte at the extreme left (loop back address). Example: 127.x.x.x
- "224" or more is specified for one byte at the extreme left (for multi-cast or experiment). Example: 224.x.x.x
- The host address consists of only "0" or "255" (broadcast address). Example: 128.0.255.255, 192.168.1.0

[Send Timeout]

Set the time-out time for the V7 series to send a EREAD/EWRITE command on the Ethernet.

[Port No.] (256 to 65535) (Default: 10000)

Set the port number.
The port number may be fixed depending on the PLC model. For more information, refer to "(B) Connecting to the PLC on the Ethernet" (page App5-12) or the individual PLC manuals.

Port No.

Multiple applications are running on each node, and communications are carried out for each application between the nodes. Consequently, it is necessary to have a means to identify the application that data should be transferred to. The port number works as this identifier.
Each port number is 16-bit data (from 0 to 65535). However, since some numbers are already used, the setting range available with V7i or V706 is from 256 to 65535. It is recommended to set a greater number.
Note that "8001" is allocated to the port for screen data transfer from the editor. Use a number other than "8001."

[Select Port]

Select either AUI or 10BASE-T. When connecting to the LAN connector of V7i or V706 + DU-01, select [10BASE-T].
Select either [10BASE-T] or [AUI] when CU-03-2 is mounted.

[Memory Protect]

Attach a check mark (☑) when write-protecting the internal memory or memory card.

[Default Gateway]

Attach a check mark (☑) when setting the default gateway.

Default Gateway

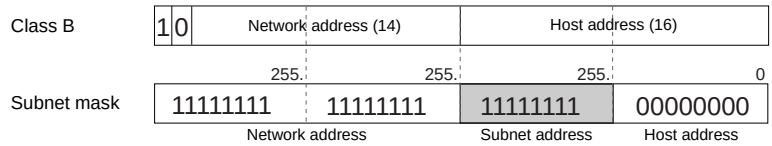
A gateway and a router are used for communicating between different networks.
The IP address of the gateway (router) should be set to communicate with the node(s) on other network.

[Sub Net Mask]

Attach a check mark (☑) when setting the subnet mask.
When this option is checked, it is set to [255.255.255.0].

Subnet Mask

A subnet mask is used for dividing one network address into multiple networks (subnet).
The subnet is assigned by specifying a part of the host address in the IP address as a subnet address.



Unusable subnet masks

- All bits are set to “0.”: 0.0.0.0
- All bits are set to “1.”: 255.255.255.255

V-SFT Setting: Macro

This section explains the macro commands (SEND/EREAD/EWRITE) used for the Ethernet. For more information on macro commands, refer to the Macro Reference.

Macro Command

[EREAD]

Words from the F1 memory in the V7 series of the network table number specified for F3 are read into the F0 memory. F2 designates the number of words to be read.

Usable Devices

	Internal Memory	PLC Memory	Constant	Memory Card	Indirect Designation	Double-word	IP Address
F0	○	○		○	○		
F1	○	○		○	○		
F2	○		○				
F3	○		○				○

EREAD: Read into memory

EREAD F0 = F1 C: F2 F3

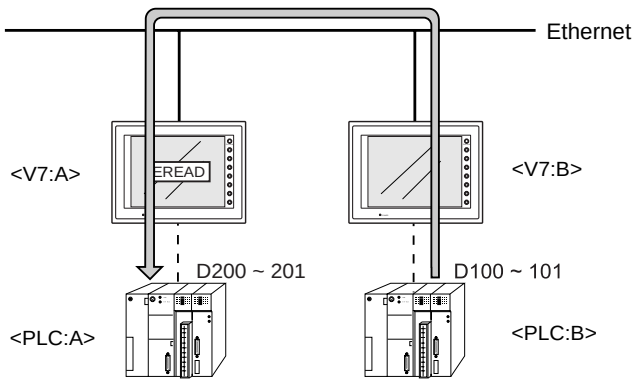
Example: Macro command at the V7 (A)

The macro command for V7 (A) to read data from PLC (B) and transfer it to PLC (A) is shown below.

[Description] EREAD D200 = D100 C: 2 B

- D200: Top memory address of the target
- D100: Top memory address of the source
- C: 2: The number of words to be transferred
- B: Address of the source (Network table number)

[Contents] Two words starting from D100 in PLC (B) are read into D200 in PLC (A).



[EWRITE]

Words from the F2 memory are written into the F0 memory in the V7 series of the network table number specified for F1. F3 designates the number of words to be written.

Usable Devices

	Internal Memory	PLC Memory	Constant	Memory Card	Indirect Designation	Double-word	IP Address
F0	○	○		○	○		
F1	○		○				○
F2	○	○		○	○		
F3	○		○				

EWRITE: Write to memory

EWRITE F0 F1 = F2 C: F3

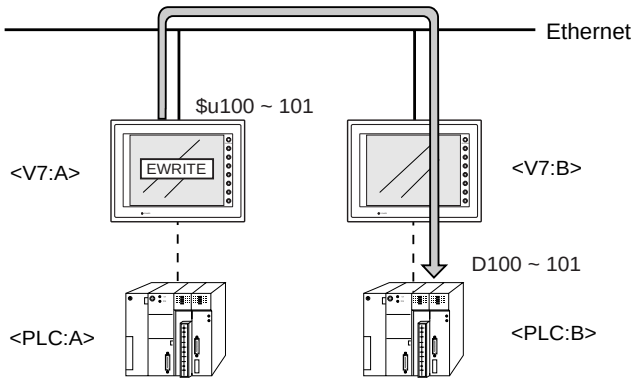
Example: Macro command at the V7 (A)

The macro command for V7 (A) to write data in V7 (A) to PLC (B) is shown below.

[Description] EWRITE D100 B = $u100 C: 2

- D100: Top memory address of the target
- B: Address of the target (Network table number)
- $u100: Top memory address of the source
- C: 2: The number of words to be transferred

[Contents] Two words starting from $u100 in V7 (A) are written into D100 in PLC (B).



[SEND]

Words from the F0 memory are transferred to the server of the network table number specified for F2. F1 designates the number of words to be transferred.

Usable Devices

	Internal Memory	PLC Memory	Constant	Memory Card	Indirect Designation	Double-word	IP Address
F0	○	○		○	○		
F1	○		○				
F2	○		○				○

SEND: Send to server

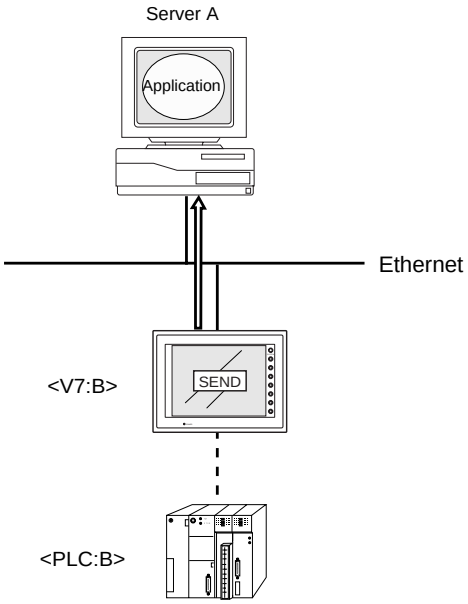
SEND F0 C: F1 TO: F2

Example: Macro command at the V7 (B)
The macro command for V7 (B) to transfer data to server (A) is shown below.

[Description] SEND $u100 C: 2 TO: A

- $u100: Top memory address of the source
- C: 2: The number of words to be transferred
- TO: A: Address of the target (Network table number)

[Contents] Two words starting from $u100 in V7 (B) are transferred to server (A).



System Memory

The Ethernet status is output to the system memory ($s) of the V7 series.
This section explains the memory addresses ($s514 to 619) where the Ethernet status is output.
For other memory addresses, refer to the Reference Manual.

List

Address	Contents
⋮	⋮
$s514	Macro user request wait (0: absent 1: present)
515	Result of executing the macro user request wait
516	
517	
518	Ethernet status
519	
520	Network table 0 status
521	Network table 1 status
522	Network table 2 status
523	Network table 3 status
524	Network table 4 status
525	Network table 5 status
526	Network table 6 status
527	Network table 7 status
528	Network table 8 status
529	Network table 9 status
530	Network table 10 status
531	Network table 11 status
532	Network table 12 status
533	Network table 13 status
534	Network table 14 status
535	Network table 15 status
536	Network table 16 status
537	Network table 17 status
538	Network table 18 status
539	Network table 19 status
540	Network table 20 status
541	Network table 21 status
542	Network table 22 status
543	Network table 23 status
544	Network table 24 status
545	Network table 25 status
546	Network table 26 status
547	Network table 27 status
548	Network table 28 status
549	Network table 29 status
550	Network table 30 status
551	Network table 31 status
552	Network table 32 status

Address	Contents
$s553	Network table 33 status
554	Network table 34 status
555	Network table 35 status
556	Network table 36 status
557	Network table 37 status
558	Network table 38 status
559	Network table 39 status
560	Network table 40 status
561	Network table 41 status
562	Network table 42 status
563	Network table 43 status
564	Network table 44 status
565	Network table 45 status
566	Network table 46 status
567	Network table 47 status
568	Network table 48 status
569	Network table 49 status
570	Network table 50 status
571	Network table 51 status
572	Network table 52 status
573	Network table 53 status
574	Network table 54 status
575	Network table 55 status
576	Network table 56 status
577	Network table 57 status
578	Network table 58 status
579	Network table 59 status
580	Network table 60 status
581	Network table 61 status
582	Network table 62 status
583	Network table 63 status
584	Network table 64 status
585	Network table 65 status
586	Network table 66 status
587	Network table 67 status
588	Network table 68 status
589	Network table 69 status
590	Network table 70 status
591	Network table 71 status
592	Network table 72 status
593	Network table 73 status
594	Network table 74 status
595	Network table 75 status
596	Network table 76 status
597	Network table 77 status
598	Network table 78 status
599	Network table 79 status

Address	Contents
$s600	Network table 80 status
601	Network table 81 status
602	Network table 82 status
603	Network table 83 status
604	Network table 84 status
605	Network table 85 status
606	Network table 86 status
607	Network table 87 status
608	Network table 88 status
609	Network table 89 status
610	Network table 90 status
611	Network table 91 status
612	Network table 92 status
613	Network table 93 status
614	Network table 94 status
615	Network table 95 status
616	Network table 96 status
617	Network table 97 status
618	Network table 98 status
619	Network table 99 status

Addresses

- $s514, 515
  These addresses are related to macro commands [SEND], [EREAD] and [EWRITE].

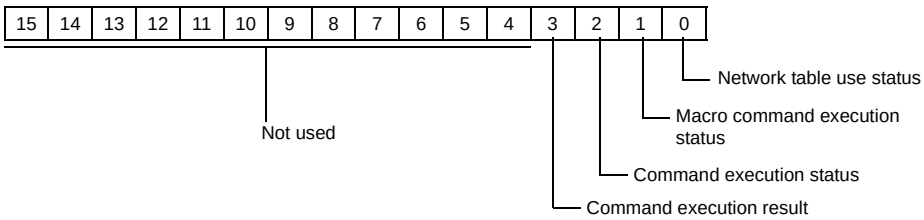
  $s514: Sets the executing status of the macro.
  In the case of "0," the next step of the macro is executed without waiting for the completion of the command when a command request is given to the Ethernet.
  In the case of other than "0," the wait status continues until the command completes, and then the next step of the macro is executed.

  * If the same port is accessed for execution of commands on one macro sheet, set a value other than "0." If "0" is set, the macro command executed next is deleted.

  $s515: Stores the result of macro execution. An error occurs if a value other than "0" is stored.
  For more information, refer to the error codes (page App5-44).
  However, when $s514 is "0," the data before the command request is stored.

- $s518
  Stores the current status of the Ethernet. An error occurs if a value other than "0" is stored.
  For more information, refer to the error codes (page App5-43).

- $s520 to 619
  Stores the statuses of network table No. 0 to 99.



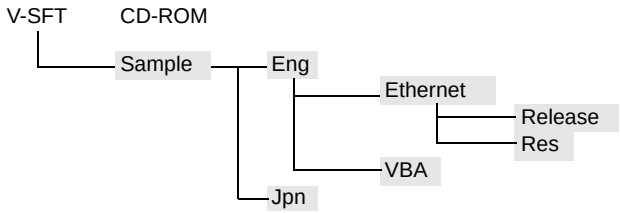
  - Bit 0 (Network table use status)
    [0]: Not used [1]: Used
    For the current station, "0" (not used) is input.
  - Bit 1 (Macro command execution status)
    Stores the execution status of macro command [SEND], [EREAD] or [EWRITE].
    [0]: Waiting [1]: Executing
  - Bit 2 (Command execution status)
    Stores the execution status of the command from the server or other station.
    [0]: Waiting [1]: Executing (read/write command)
  - Bit 3 (Macro command execution result)
    Stores the execution result of macro command [SEND], [EREAD] or [EWRITE].
    [0]: Normal [1]: Error
  - Bits 4 to 15 (System reserved)
    Not used at present. Always set "0."

Ethernet Access Functions (HKEtn10.DLL)

To enable Ethernet communications between the server and the V7 series, it is necessary to create an application based on HKEtn10.dll (for UDP/IP) provided by us, using Visual C++, Visual Basic, etc.

Sample Folder

The “Sample” folder for Ethernet communications is included in the V-SFT CD-ROM.
The [Ethernet] folder contains sample programs created using Visual C++, and the [VBA] folder contains those created using VBA.
Refer to these sample program when creating an application. If necessary, you can copy and tailor the program to your requirements.



- Ethernet
  The following files are contained in the respective folders.
  [Ethernet]
  - ESmpl.dsp - ESmpl.h - ESmpl.cpp - ESmpl.rc
  - ESmpl.clw - MainFrm.h - MainFrm.cpp - ESmplDoc.h
  - ESmplDoc.cpp - ESmplView.h - ESmplView.cpp - StdAfx.h
  - StdAfx.cpp - Resource.h - ReadMe.txt - HKEtn10.h

  [Release]
  - HKEtn10.dll - HKEtn10.lib

  [res]
  - ESmpl.ico - ESmpl.rc2 - Toolbar.bmp - ESmplDoc.ico
- VBA
  The following files are contained in this folder.
  [VBA]
  - HKEtn10.dll
  - VBA_Sample.xls

* To execute this program, copy the above files to the “C:\TEST” folder.
Port No. 10000 is set.
When changing the copy target or the port number, change the setting in the program accordingly.

- Notes on use of the sample programs
  The data type to be set when creating a program varies depending on whether Visual C++ or Visual Basic is used.
  For the data type and range, refer to the following tables.

Visual C++	VB
BYTE	Byte
short	Integer
unsigned short	
WORD	
int	Long
long	
DWORD	
char	String

Visual C++

Data Type	Bytes	Data Range
BYTE	1	0 to 255
short	2	−32768 to 32767
unsigned short	2	0 to 65535
long	4	−2147483648 to 2147483647
int	4	−2147483648 to 2147483647
WORD	2	0 to 65535
DWORD	4	0 to 4294967295
char	1	−128 to 127

Visual Basic

Data Type	Bytes	Data Range
Byte	1	0 to 255
Boolean	2	TRUE(0) / FALSE(−1)
Integer	2	−32768 to 32767
Long	4	−2147483648 to 2147483647
Double	8	4.94E−324 to 1.79E+308
String	Variable	0 to 2 GB

Function Specifications

List

- Read

PLC Memory Word	int HKEtn_ReadPlcMemory(WORD *dp,unsigned short Wordcnt,int DeviceType,DWORD addr,char *lpAddr,int DFlag=1)	Page App5-31
PLC memory Double-word	int HKEtn_ReadPlcMemory2(DWORD *dp,unsigned short Wordcnt,int DeviceType,DWORD addr,char *lpAddr,int DFlag=1)	Page App5-32
Internal memory Word	int HKEtn_ReadInternalMemory(WORD *dp,unsigned short Wordcnt,int DeviceType,DWORD addr,char *lpAddr,int DFlag=1)	
Memory card memory Word	int HKEtn_ReadCardMemory(WORD *dp,unsigned short Wordcnt,int FileNo,int RecordNo,DWORD addr,char *lpAddr,int DFlag=1)	Page App5-33
PLC memory Bit	int HKEtn_ReadPlcBitMemory(int *lpOnFlag,int DeviceType,DWORD addr,int BitNo,char *lpAddr)	
Internal memory Bit	int HKEtn_ReadInternalBitMemory(int *lpOnFlag,int DeviceType,DWORD addr,int BitNo,char *lpAddr)	Page App5-34
Memory card memory Bit	int HKEtn_ReadCardBitMemory(int *lpOnFlag,int FileNo,int RecordNo,DWORD addr,int BitNo,char *lpAddr)	

- Write

PLC memory Word	int HKEtn_WritePlcMemory(WORD *sp,unsigned short Wordcnt,int DeviceType,DWORD addr,char *lpAddr,int DFlag=1)	Page App5-35
PLC memory Double-word	int HKEtn_WritePlcMemory2(DWORD *sp,unsigned short Wordcnt,int DeviceType,DWORD addr,char *lpAddr,int DFlag=1)	Page App5-36
Internal memory Word	int HKEtn_WriteInternalMemory(WORD *sp,unsigned short Wordcnt,int DeviceType,DWORD addr,char *lpAddr,int DFlag=1)	
Memory card memory Word	int HKEtn_WriteCardMemory(WORD *sp,unsigned short Wordcnt,int FileNo,int RecordNo,DWORD addr,char *lpAddr,int DFlag=1)	Page App5-37
PLC memory Bit	int HKEtn_WritePlcBitMemory(int DeviceType,DWORD addr,int BitNo,int OnFlag,char *lpAddr)	
Internal memory Bit	int HKEtn_WriteInternalBitMemory(int DeviceType,DWORD addr,int BitNo,int OnFlag,char *lpAddr)	Page App5-38
Memory card memory Bit	int HKEtn_WriteCardBitMemory(int FileNo,int RecordNo,DWORD addr,int BitNo,int OnFlag,char *lpAddr)	

- Others

Initialization function	int HKEtn_Init(unsigned short Port=10000,int Retry=3,int RecvTime=2,int RecvTime2=10)	Page App5-38
Receive wait from V7	int HKEtn_Recvfrom(BYTE *dp,short *lpCnt)	
Cancel receive wait function	void HKEtn_Cancel(void)	Page App5-39
Request connection information	int HKEtn_GetInf(struct inf *lpinf,char *lpAddr)	
Close processing	int HKEtn_Close()	
Get source's IP address	int HKEtn_GetSinAddr(char *lpAddr)	
Get error contents	int HKEtn_GetLastError()	Page App5-40

Read

Read Words from PLC Memory

int HKEtn_ReadPlcMemory(WORD *dp,unsigned short Wordcnt,int DeviceType,DWORD addr,char *lpAddr, int DFlag=1)

This function is retained until PLC data is transferred from the V7 series.

- Parameters

*dp — Target pointer of the data to be read

Contents	Word Count
No. 1	1
No. 2	1
⋮	⋮
No. n	1

Wordcnt — Word count to be read (max. 2000 words)

DeviceType — Address of the device to be read (Refer to “Chapter 2” to “Chapter 33.”)

addr — Top memory address to be read

* For YOKOGAWA or YASKAWA PLCs, specify a number “–1” for the address (addr).
Example: D400 → 399 D25 → 24

*lpAddr — IP address shown as a string of characters separated by dots
Example: “192.168.XXX.XXX”

DFlag — 0, 1, 2 (Refer to the table below.)

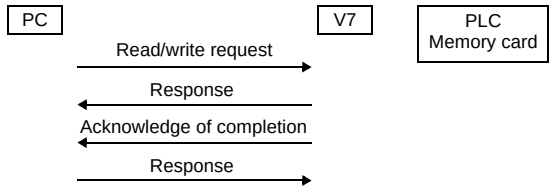
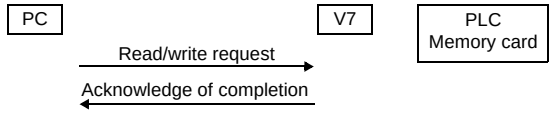
- Return values

Success — TRUE

Failure — FALSE

Error details — Get using HKEtn_GetLastError ().

- Priority and communication procedure depending on the DFlag setting are shown below.

DFlag	Priority	Communication Procedure
0	Communications	
1	Display	
2	Display	

Read Double-words from PLC Memory

int HKEtn_ReadPlcMemory2(DWORD *dp,unsigned short Wordcnt,int DeviceType,DWORD addr,char *lpAddr, int DFlag=1)

This function is retained until PLC data is transferred from the V7 series.

- Parameters

*dp — Target pointer of the data to be read

Contents	Word Count
No. 1	2
No. 2	2
⋮	⋮
No. n	2

Wordcnt — Word count to be read (max. 1000 words)
DeviceType — Address of the device to be read (Refer to “Chapter 2” to “Chapter 33.”)
addr — Top memory address to be read
* For YOKOGAWA or YASKAWA PLCs, specify a number “–1” for the address (addr).
Example: D400 → 399 D25 → 24
*lpAddr — IP address shown as a string of characters separated by dots
Example: “192.168.XXX.XXX”
DFlag — 0, 1, 2 (Refer to page App5-31.)

- Return values

Success — TRUE
Failure — FALSE
Error details — Get using HKEtn_GetLastError ().

Read Words from Internal Memory

int HKEtn_ReadInternalMemory(WORD *dp,unsigned short Wordcnt,int DeviceType,DWORD addr,char *lpAddr,int DFlag=1)

This function is retained until data is transferred from the V7 series.

- Parameters

*dp — Target block pointer

Contents	Word Count
No. 1	1
No. 2	1
⋮	⋮
No. n	1

Wordcnt — Word count to be transferred (max. 2000 words)
DeviceType — 0: $u 1: $s 2: $L 3: $LD 4: $T
addr — Top memory address to be read
*lpAddr — IP address shown as a string of characters separated by dots
Example: “192.168.XXX.XXX”
DFlag — 0, 1, 2 (Refer to page App5-31.)

- Return values

Success — TRUE
Failure — FALSE
Error details — Get using HKEtn_GetLastError ().

Read Words from Memory Card Memory

int HKEtn_ReadCardMemory(WORD *dp,unsigned short Wordcnt,int FileNo,int RecordNo,DWORD addr,char *lpAddr,int DFlag=1)

This function is retained until data is transferred from the V7 series.

- Parameters

*dp — Target block pointer

Contents	Word Count
No. 1	1
No. 2	1
⋮	⋮
No. n	1

Wordcnt — Word count to be transferred (max. 2000 words)
FileNo — File number
RecordNo — record number
addr — Top memory address to be read
*lpAddr — IP address shown as a string of characters separated by dots
Example: “192.168.XXX.XXX”
DFlag — 0, 1, 2 (Refer to page App5-31.)

- Return values

Success — TRUE
Failure — FALSE
Error details — Get using HKEtn_GetLastError ().

Read Bits from PLC Memory

int HKEtn_ReadPlcBitMemory(int *lpOnFlag,int DeviceType,DWORD addr,int BitNo,char *lpAddr)

This function is retained until PLC data is transferred from the V7 series.

- Parameters

*lpOnFlag — Returns the bit status. 0: OFF 1: ON
DeviceType — Address of the device to be read (Refer to “Chapter 2” to “Chapter 33.”)
addr — Top memory address to be read
* For YOKOGAWA or YASKAWA PLCs, specify a number “–1” for the address (addr).
Example: D400 → 399 D25 → 24
BitNo — Bit number to be read
Example 1: When accessing to D20-05 of MITSUBISHI PLC
DeviceType 0
addr 20
BitNo 5
Example 2: When accessing to M20 of MITSUBISHI PLC
20 ÷ 16 = 1 ... 4
DeviceType 6
addr 1
BitNo 4
*lpAddr — IP address shown as a string of characters separated by dots
Example: “192.168.XXX.XXX”

- Return values

Success — TRUE
Failure — FALSE
Error details — Get using HKEtn_GetLastError ().

Read Bits from Internal Memory

int HKEtn_ReadInternalBitMemory(int *lpOnFlag,int DeviceType,DWORD addr,int BitNo,char *lpAddr)

This function is retained until data is transferred from the V7 series.

- Parameters

*lpOnFlag	Returns the bit status.	0: OFF	1: ON		
DeviceType	0: $u	1: $s	2: $L	3: $LD	4: $T
addr	Top memory address to be read				
BitNo	Bit number to be read				
*lpAddr	IP address shown as a string of characters separated by dots Example: “192.168.XXX.XXX”				

- Return values

Success	TRUE
Failure	FALSE
Error details	Get using HKEtn_GetLastError ().

Read Bits from Memory Card Memory

int HKEtn_ReadCardBitMemory(int *lpOnFlag,int FileNo,int RecordNo,DWORDaddr,int BitNo,char *lpAddr)

This function is retained until data is transferred from the V7 series.

- Parameters

*lpOnFlag	Returns the bit status.	0: OFF	1: ON
FileNo	File number		
RecordNo	Record number		
addr	Top memory address to be read		
BitNo	Bit number to be read		
*lpAddr	IP address shown as a string of characters separated by dots Example: “192.168.XXX.XXX”		

- Return values

Success	TRUE
Failure	FALSE
Error details	Get using HKEtn_GetLastError ().

Write

Write Words to PLC Memory

int HKEtn_WritePlcMemory(WORD *sp,unsigned short Wordcnt,int DeviceType,DWORD addr,char *lpAddr, int DFlag=1)

This function is retained until write completion is received from the V7 series.
(It is reset on receipt of write completion to the PLC memory.)

- Parameters

*sp — Target block pointer

Contents	Word Count
No. 1	1
No. 2	1
⋮	⋮
No. n	1

Wordcnt — Word count to be transferred (max. 2000 words)
DeviceType — Address of the device to be written (Refer to “Chapter 2” to “Chapter 33.”)
addr — Top memory address to be written
* For YOKOGAWA or YASKAWA PLCs, specify a number “–1” for the address (addr).
Example: D400 → 399 D25 → 24
*lpAddr — IP address shown as a string of characters separated by dots
Example: “192.168.XXX.XXX”
DFlag — 0, 1, 2 (Refer to page App5-31.)

- Return values

Success — TRUE
Failure — FALSE
Error details — Get using HKEtn_GetLastError ().

Write Double-words to PLC Memory

int HKEtn_WritePlcMemory2(DWORD *sp,unsigned short Wordcnt,int DeviceType,DWORD addr,char *lpAddr, int DFlag=1)

This function is retained until write completion is received from the V7 series.
(It is reset on receipt of write completion to the PLC memory.)

- Parameters

*sp — Target block pointer

Contents	Word Count
No. 1	2
No. 2	2
⋮	⋮
No. n	2

Wordcnt — Word count to be transferred (max. 1000 words)
DeviceType — Address of the device to be written (Refer to “Chapter 2” to “Chapter 33.”)
addr — Top memory address to be written
* For YOKOGAWA or YASKAWA PLCs, specify a number “−1” for the address (addr).
Example: D400 → 399 D25 → 24
*lpAddr — IP address shown as a string of characters separated by dots
Example: “192.168.XXX.XXX”
DFlag — 0, 1, 2 (Refer to page App5-31.)

- Return values

Success — TRUE
Failure — FALSE
Error details — Get using HKEtn_GetLastError ().

Write Words to Internal Memory

int HKEtn_WriteInternalMemory(WORD *sp,unsigned short Wordcnt,int DeviceType,DWORD addr,chr *lpAddr,int DFlag=1)

This function is retained until write completion is received from the V7 series.
(It is reset on receipt of write completion to the internal memory.)

- Parameters

*sp — Target block pointer

Contents	Word Count
No. 1	1
No. 2	1
⋮	⋮
No. n	1

Wordcnt — Word count to be transferred (max. 2000 words)
DeviceType — 0: $u 1: $s 2: $L 3: $LD 4: $T
addr — Top memory address to be written
*lpAddr — IP address shown as a string of characters separated by dots
Example: “192.168.XXX.XXX”
DFlag — 0, 1, 2 (Refer to page App5-31.)

- Return values

Success — TRUE
Failure — FALSE
Error details — Get using HKEtn_GetLastError ().

Write Words to Memory Card Memory

int HKEtn_WriteCardMemory(WORD *sp,unsigned short Wordcnt,int FileNo,int RecordNo,DWORD addr,char *lpAddr,int DFlag=1)

This function is retained until write completion is received from the V7 series.
(It is reset on receipt of write completion to the memory card memory.)

- Parameters

*sp — Target block pointer

Contents	Word Count
No. 1	1
No. 2	1
⋮	⋮
No. n	1

Wordcnt — Word count to be transferred (max. 2000 words)
FileNo — File number
RecordNo — Record number
addr — Top memory address to be written
*lpAddr — IP address shown as a string of characters separated by dots
Example: “192.168.XXX.XXX”
DFlag — 0, 1, 2 (Refer to page App5-31.)

- Return values

Success — TRUE
Failure — FALSE
Error details — Get using HKEtn_GetLastError ().

Write Bits to PLC Memory

int HKEtn_WritePlcBitMemory(int DeviceType,DWORD addr,int BitNo,int OnFlag,char *lpAddr)

This function is retained until write completion is received from the V7 series.
(It is reset on receipt of write completion to the PLC memory.)

- Parameters

DeviceType — Address of the device to be written (Refer to “Chapter 2” to “Chapter 33.”)
addr — Top memory address to be written
* For YOKOGAWA or YASKAWA PLCs, specify a number “–1” for the address (addr).
Example: D400 → 399 D25 → 24

BitNo — Bit number to be accessed
Example 1: When accessing to D20-05 of MITSUBISHI PLC
DeviceType 0
addr 20
BitNo 5
Example 2: When accessing to M20 of MITSUBISHI PLC
20 ÷ 16 = 1 ... 4
DeviceType 6
addr 1
BitNo 4

OnFlag — 0: OFF 1: ON
*lpAddr — IP address shown as a string of characters separated by dots
Example: “192.168.XXX.XXX”

- Return values

Success — TRUE
Failure — FALSE
Error details — Get using HKEtn_GetLastError ().

Write Bits to Internal Memory

int HKEtn_WriteInternalBitMemory(int DeviceType,DWORD addr,int BitNo,int OnFlag,char *lpAddr)

This function is retained until write completion is received from the V7 series.
(It is reset on receipt of write completion to the internal memory.)

- Parameters

DeviceType	0: $u 1: $s 2: $L 3: $LD 4: $T
addr	Top memory address to be written
BitNo	Bit number to be accessed
OnFlag	0: OFF 1: ON
*lpAddr	IP address shown as a string of characters separated by dots Example: “192.168.XXX.XXX”

- Return values

Success	TRUE
Failure	FALSE
Error details	Get using HKEtn_GetLastError ().

Write Bits to Memory Card Memory

int HKEtn_WriteCardBitMemory(int FileNo,int RecordNo,DWORD addr,int BitNo,int OnFlag,char *lpAddr)

This function is retained until write completion is received from the V7 series.
(It is reset on receipt of write completion to the memory card memory.)

- Parameters

FileNo	File number
RecordNo	Record number
addr	Top memory address to be written
BitNo	Bit number to be accessed
OnFlag	0: OFF 1: ON
*lpAddr	IP address shown as a string of characters separated by dots Example: “192.168.XXX.XXX”

- Return values

Success	TRUE
Failure	FALSE
Error details	Get using HKEtn_GetLastError ().

Others Functions

Initialization Function

int HKEtn_Init(unsigned short Port=10000,int Retry=3,int RecvTime=2,int RecvTime2=10)

Creates a socket.

- Parameters

Port	Set 10000 or above.
Retry	Number of send retrials
RecvTime	Receive timeout *1
RecvTime2	Receive timeout 2 *2

*1 When “HKEtn_Recvfrom()” is used, the time for [RecvTime] is used for timeout judgment.

*2 When “HKEtn_Readxxx” or “HKEtn_Writexxx” is used, both the times for [RecvTime] and [RecvTime2] are used for timeout judgment.
Total time for timeout = [RecvTime] x [RecvTime2] x [Retry] (seconds)

- Return values

Success	TRUE
Failure	FALSE
Error details	Get using HKEtn_GetLastError ().

Receive Wait from V7

int HKEtn_Recvfrom(BYTE *dp,short *lpCnt)

This function is retained internally until data is received from the V7 series.
The function returns a response and ends only when a command is received.
The user should interpret the received data and create the next action.
This function must be executed within the thread.

- Parameters

*dp	Top pointer of receive buffer Allocate 5000 bytes.
*lpCnt	Returns the number of bytes received.

- Return values

Success	TRUE
Failure	FALSE
Error details	Get using HKEtn_GetLastError ().

Cancel Receive Wait Function

void HKEtn_Cancel(void)

Cancels the function in the receive wait status, such as Recvfrom().

Request Connection Information

int HKEtn_GetInf(struct inf *lpinf,char *lpAddr)

- Parameters

*lpinf	All “0”
*lpAddr	IP address shown as a string of characters separated by dots Example: “192.168.XXX.XXX”

- Return values

Success	TRUE
Failure	FALSE
Error details	Get using HKEtn_GetLastError ().

Close Processing

int HKEtn_Close()

Execute this function when ending HKEtn10.dll.

Get Source’s IP Address

int HKEtn_GetSinAddr(char *lpAddr)

Execute this function after the recvfrom() function or receiving the data.

Get Error Contents

int HKEtn_GetLastError()

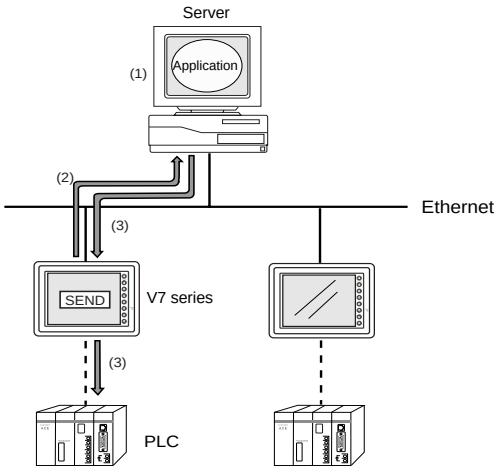
- Error codes and solutions

Code	Contents	Solution
–1	Undefined command (receive timeout)	Check the command.
–2	Undefined IP address	Check the IP address.
–3	Target station busy	Reduce the frequency of communications.
–4	Illegal packet bytes	Check response processing at the target station.
–5	Packet bytes exceed the maximum number.	Reduce the send packet size.
–6	Local mode error	Check that the target station is in the RUN mode.
–7	Preparing for communications	Start communications when the target station is ready.
–8	Communication failure – Cannot access	Check the target station.
–9	Cannot process due to short memory	Check the memory space at the target station.
–10	Illegal received data	Check the command.
–20	Socket initialization error	Check parameters for initialization.
–50	Requested packet byte exceeds the maximum number.	Reduce the requested size.
–51	Address error	Check the requested memory type.
–52	Communication failure – Cannot access	Check the target station.
–54	Write protected	Check write-protection of the card.
–55	Cannot process due to short memory	Check the memory space at the target station.
–56	Sampling buffer error	Check the command.
–100	Processing another command	Continue retrying.
–101	Command control – Buffer over	Reduce the frequency of communications.
–120	Communications aborted by the user	Communications are forcibly aborted.
–121	Received during command processing	Reduce the frequency of communications.

Server Communication Procedure

Data Request from V7 to Server

(1) Execute the receive wait thread using “int HKEtn_RecvFrom()” on the application of the server.
(2) Send the command from the V7 series to the server using macro command SEND.
(3) The server analyzes the command and takes the appropriate action.



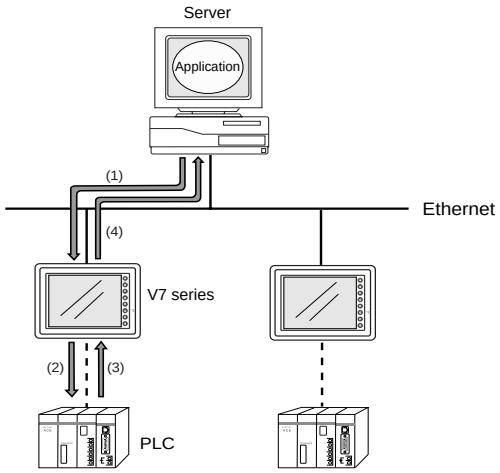
User data format

Transfer from the V7 series

Item	Bytes
Packet bytes 2 + 2 + 1 + n	2
Transaction No.	2
Command (0x33)	1
User data	n

PLC Data Request from Server to V7

(1) A request is sent from the application of the server to the V7 series. Use “int HKEtn_ReadPlcMemory()” for a memory request.
(2) (3) The V7 series reads the PLC memory.
(4) The V7 series returns data read from the PLC memory to the server.



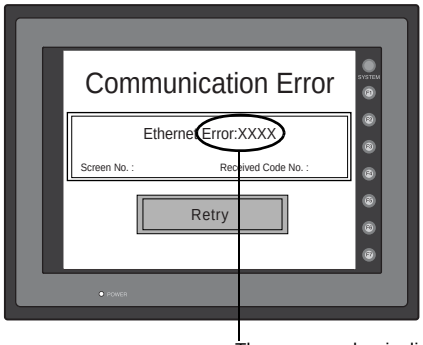
Error Display

Error messages displayed on the V7 series and those stored in the system memory are explained.

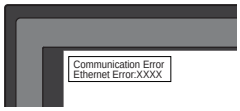
Communication Errors

The Ethernet status is stored in system memory address $s518 of the V7 series during Ethernet communications
The communication error occurs when a code other than “0” (normal) is stored in system memory address $s518.

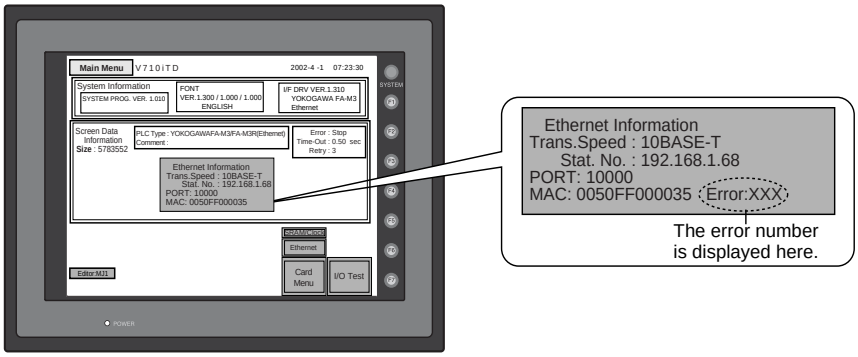
- In the RUN mode



* When [Continue] is selected for [Comm. Err. Handling] in the [Detail] tab window of the [Comm. Parameter] dialog, a following screen is displayed.



- To check the occurrence of an error on the Main Menu screen:



- System memory: $s518

No.	Contents	Solution
0	Normal	
200	Failed in send request	Check cable connection and network table setting of the target station.
201	Send error	Check that the setting on the target station is consistent with the network table setting.
202	Internal port error	The communication unit is in the older version or is faulty.
204	TCP connection over	The number of connections reaches the maximum, and no more connection is possible. Check the communication lines.
205	TCP connection error	Connection cannot be established. Check the communication lines, or turn the power off and on.
206	TCP connection end error	TCP communication disconnection has failed. Check that the communication partner with the V7 series is present on the line.
207	TCP send error	TCP communication has failed. Check the communication lines.
350	Send buffer full	The line is busy. Consult the network administrator of your company. The communication unit is in the older version or is faulty.
351	IC receive buffer overflow	
352	Driver receive buffer overflow	
801	Receive processing error Link down error	Check the HUB or the link confirmation LED on the communication unit. If the LED is not on, check cable connection and the port setting on the network table.
802	Transceiver error	Check the transceiver and cable connection.
900	No IP address at local port	Check that the IP address of the local port is set on the network table. Check if the same IP address is set on the network.
901	Duplicated IP address error	
902	Send socket ID error (error that may occur when V7i LAN port is used)	Turn the power off and back it on. If the problem persists, contact your local distributor.
1000	Ethernet I/F unit not mounted	Check whether the Ethernet I/F unit is mounted correctly, and then turn the power off and on. If the problem persists, contact your local distributor.
1001	Ethernet I/F unit not ready	
1002	Ethernet I/F unit DPRAM error	
1003	No response from Ethernet I/F unit	
1004	Ethernet receive buffer over	
1005	Ethernet send registration error	
1006	I/F unit unregistered interrupt	
1100 to 1115	Initialization error (communication unit)	
1120	Dual port access error	
1200	Undefined register	
1201	Send/receive buffer area over	
1202	MAC address error	
1203	Port error	Check whether the Ethernet I/F unit is mounted correctly, and then turn the power off and on. If the problem persists, contact your local distributor.
1301	Watch dog overflow	
1302	JAVA error LANC error	

Errors during Macro Command Execution

The execution result of macro commands SEND/EREAD/EWRITE is stored in system memory address $s515.

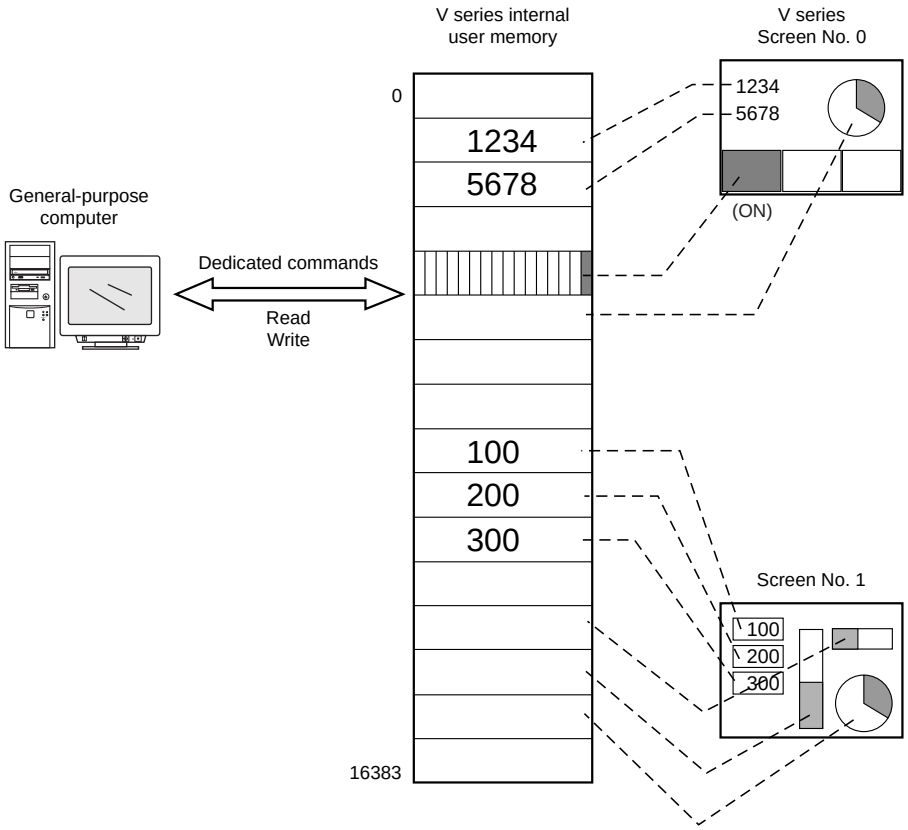
- System memory address: $s515 (response to the request)

Code	Contents	Solution
0	Normal	
200 to 2000	Communication error	Refer to “Communication Errors.”
−30	Timeout	Check if an error is occurring to the target V7.
−31	The number of words being sent exceeds the limit.	Check the number of words that can be sent in macro editing.
−32	Specified table not used	Check the setting on the network table.
−33	Cannot use the send command.	Check the macro command in macro editing.
−34	Specified table being used	Check that system memory address $s514 is set. If not, reduce the frequency of communications.
−35	Cannot process due to short memory	Check the memory space at the target station.
−36	Illegal receive packet bytes	Check the requested number of words.
−37	Memory access error	Check the setting of the requested memory.
−38	Macro setting error	Check the macro setting.
−39	Cannot process the command in the target V7 (Local mode, communication error)	Restart the target V7 to RUN mode, and execute the macro command again.

Appendix 6 Universal Serial Communications

Interface

Outline of Communication



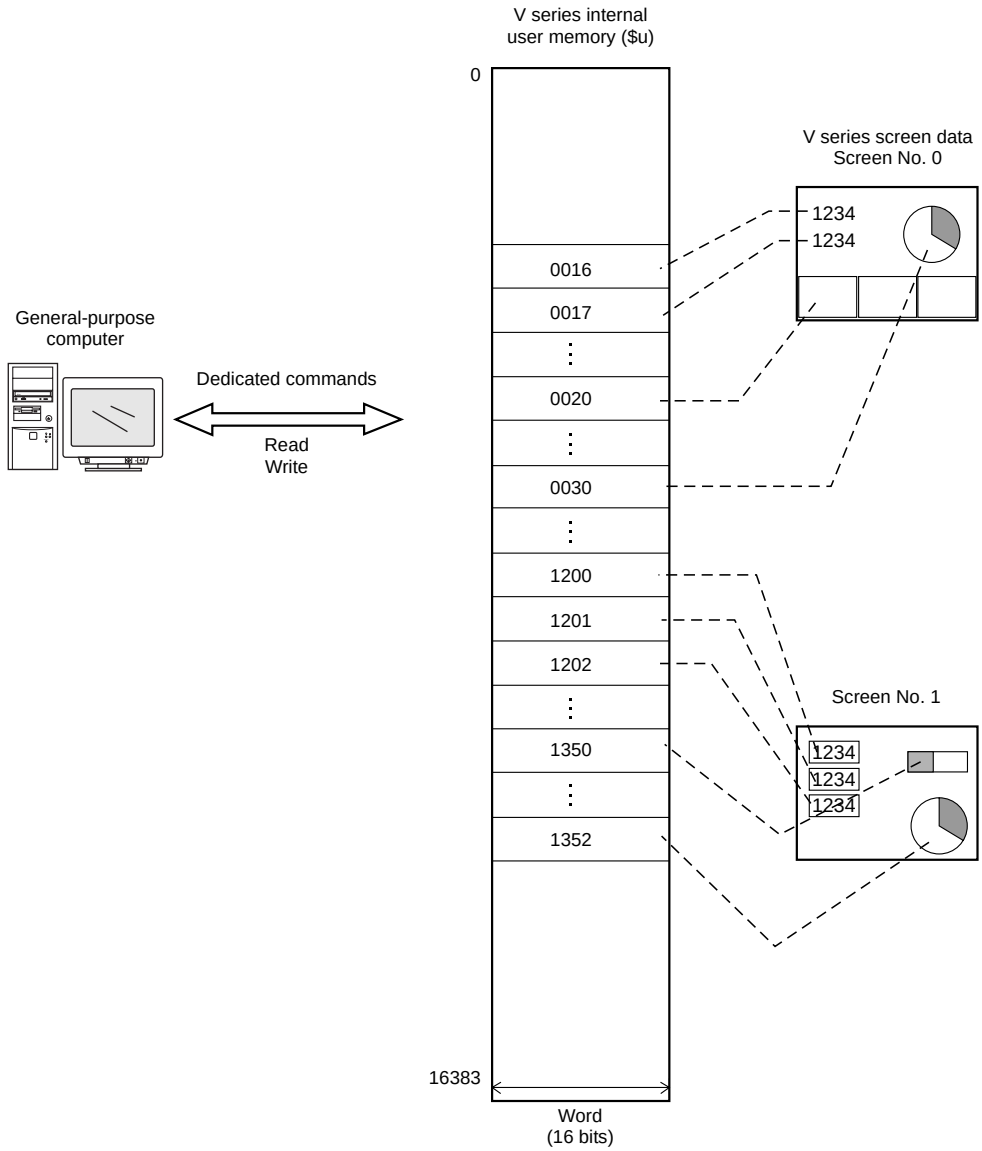
As shown in the diagram above, when a general-purpose computer communicates with the V series, the general-purpose computer acts as the host and the V series acts as the slave.
Switch, lamp, data display, etc., are allocated within the internal user memory ($u). When a screen number is specified from the host, a write action takes place to the internal memory address specified for the screen, and the specified screen is then displayed on the V series.
When a screen is changed internally by a switch, etc., the changed screen number is read, and written in the memory specified for the screen.

Differences between Connecting to a General-purpose Computer and Connecting to the PLC

- Input format (code)
  The input format used for screen number, block number, message number, etc, is fixed in [DEC].
- Write area
  When connecting to the PLC, only the three words shaded in the diagram below are used, but when connecting to a general-purpose computer, all 16 words shown below are used.

Address	Name	Contents
n + 0	CFMDAT	Sub command/data
n + 1	SCRN_COM	Screen status
n + 2	SCRN_No	Displayed screen
n + 3	SW0	No. 0 switch data
n + 4	SW1	No. 1 switch data
n + 5	ENT0	Entry information 0
n + 6	ENT1	Entry information 1
n + 7	ENT2	Entry information 2
n + 8	GREPNS	Global response
n + 9 ⋮ n + 15		Reserved (7 words)

Memory settings (for lamp, data display, etc.) are required during screen creation, and the memory addresses are mapped as shown below. The memory addresses are $u0 to 16383. Assign memory addresses for system, lamp, data display, and mode within this range.

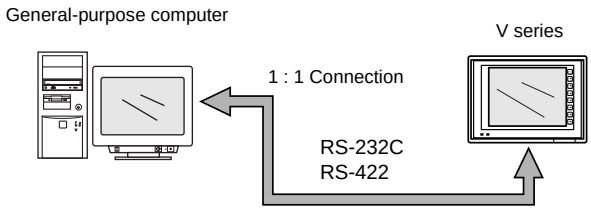


System Composition

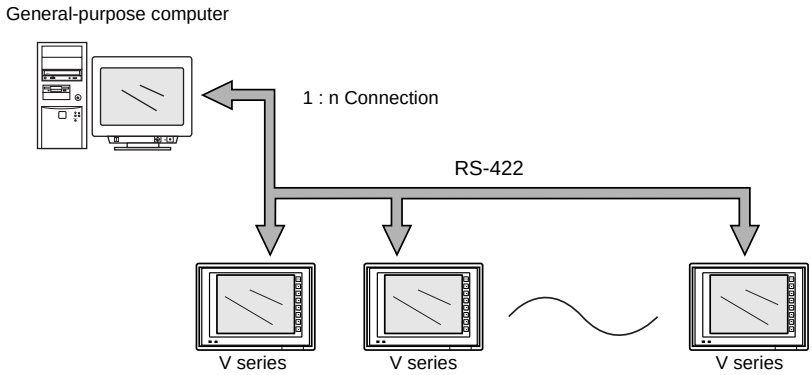
- 1 : 1 connection (one computer, one V series unit)
  (For wiring, refer to page App6-6 to page App6-6.)

  The system composition for a 1 : 1 connection is shown.
  1) Can be used when the transmission distance via RS-232C is within 15 m, or the transmission distance of RS-422 (485) is not greater than 500 m.
  2) It is possible to use an interrupt when connecting a computer to a V series unit in a 1 : 1 connection. *
     (Switch ON/OFF, ENT key of keypad, screen changing, macro OUT_ENQ)

     * For RS-422 (485) 2-wire connection, interrupts cannot be used.



- 1 : n connection (one computer, multiple V series units)
  (A maximum of 32 V series units can be connected. For wiring, refer to page App6-8.)
  The system composition for a 1 : n connection is shown.
  1) A station number specification is necessary to determine which V series will receive a command when a computer and V series units are 1 : n connected.
  2) Interrupt cannot be used when a computer and V series units are 1 : n connected.

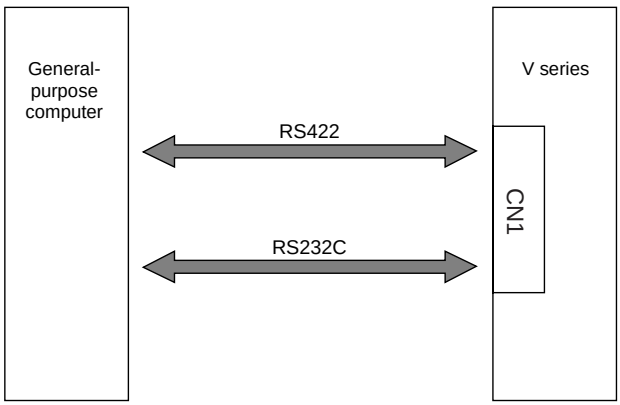


  * When V series units are 1 : n connected, it is convenient to use the TC485 (Terminal Converter, optional). (For more information, refer to TC485 (Terminal Converter) Operation Instructions.)

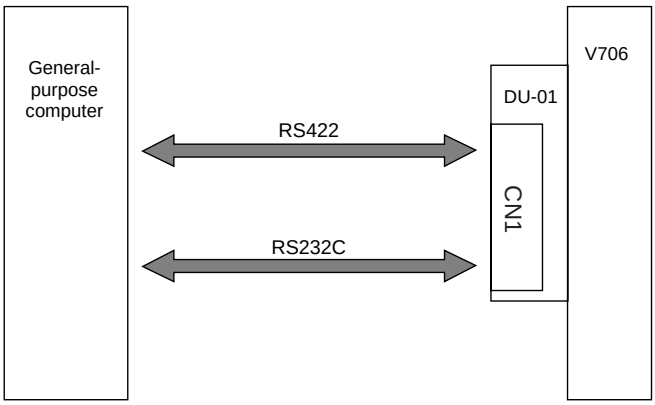
Input/Output Connector

The connection method for communication between a general-purpose personal computer and a V series unit is shown in the diagram below.

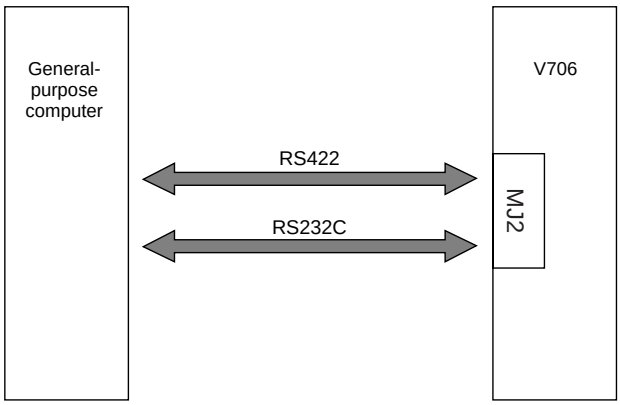
- For V series:



- For V706 + DU-01:



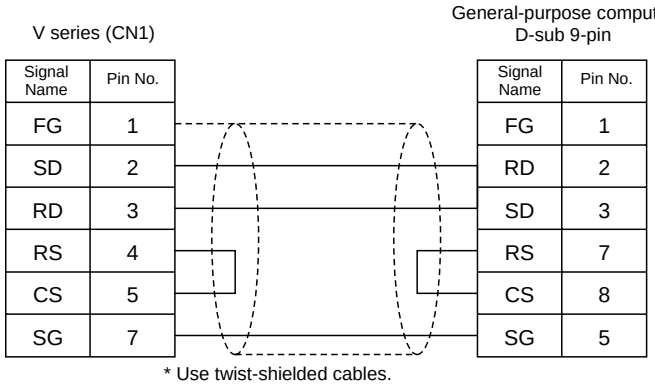
- For V706:



Wiring

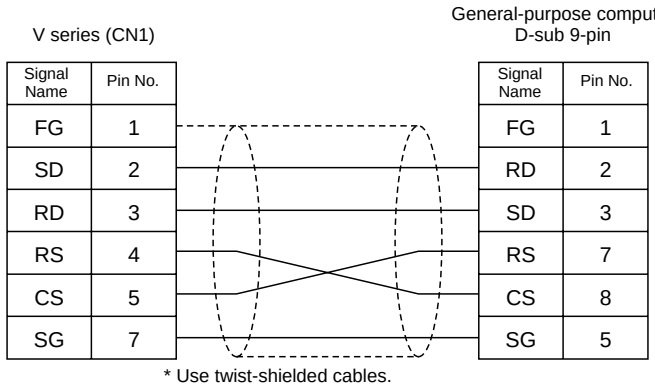
- Connect the shielded cable either to the V7 series or PLC side. This connection diagram shows the case where the shielded cable is connected on the V7 series side.
  When connecting the shielded cable to the V7 series side, connect it to pin 1 of the connector or the connector case cover.
  The metal shell of modular jack 2 on the V706 is used as SG. Connect the shielded cable to the metal shell of modular jack 2.
- For the specifications of CN1 and MJ2 (V706), refer to “Interface” (page 1-5).

CN1 - RS-232C



* Use twist-shielded cables.

<Executing Flow Control>

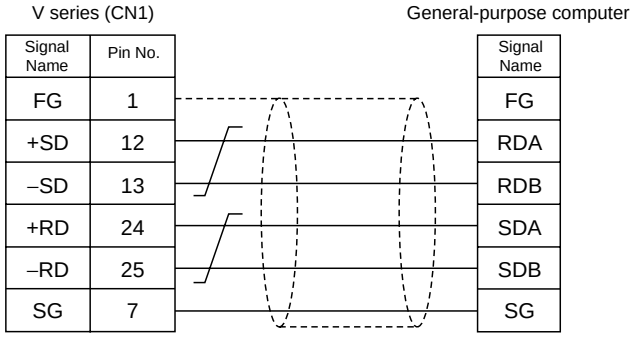


* Use twist-shielded cables.

CN1 - RS-422

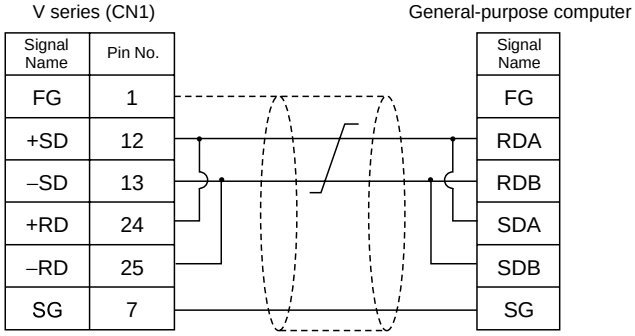
- 1 : 1 Connection

<4-wire system>



* Use twist-shielded cables.

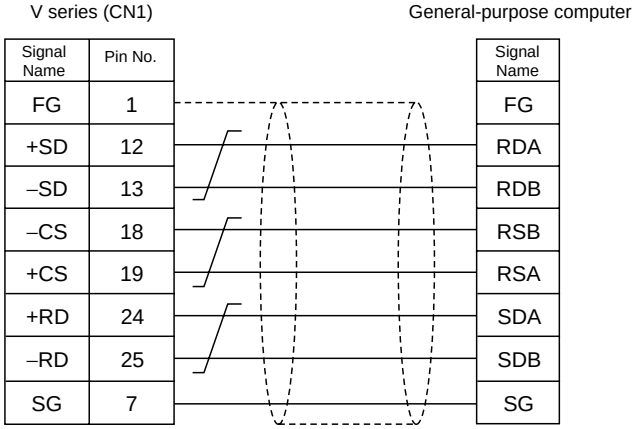
<2-wire system>



* Use twist-shielded cables.

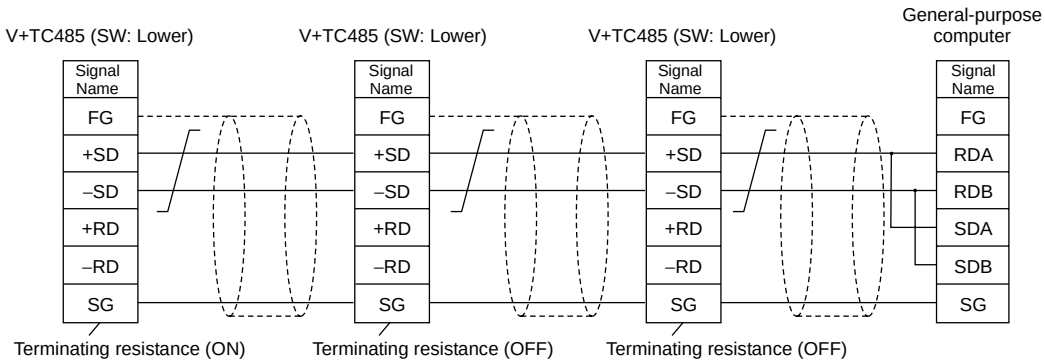
* Use TC485 (Terminal Converter, optional) when V series is connected on the terminal block. (For more information, refer to the TC485 (Terminal Converter) Operation Instructions.

<Executing Flow Control>
TC485 can not be used.



* Use twist-shielded cables.

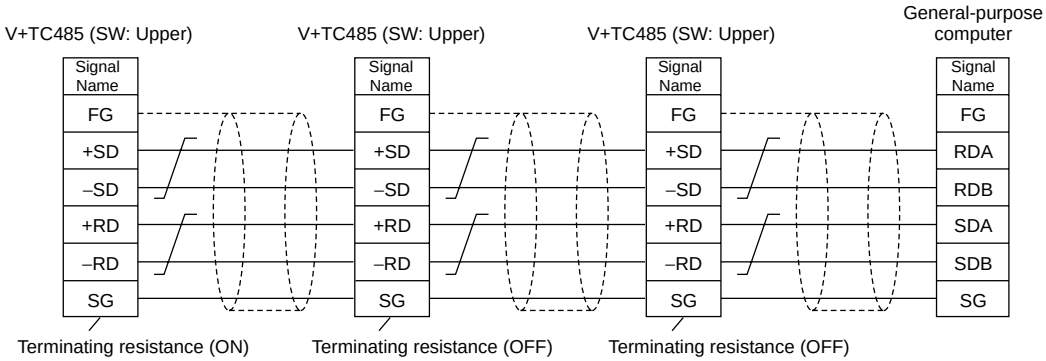
- 1 : n Connection
  <2-wire system>
  - When TC485 is used:



* Use twist-shielded cables.

  - When TC485 is not used:
    Install jumpers between +RD/+SD and –RD/–SD.

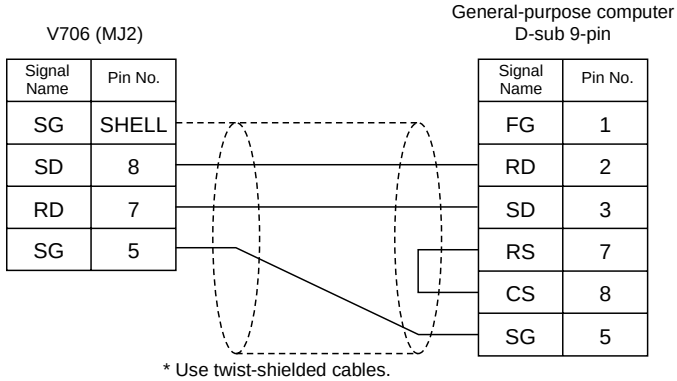
<4-wire system>



* Use twist-shielded cables.

MJ2 (V706 only) RS-232C

> **⚠CAUTION** To use an MJ2 on a V706 as an RS-232C/RS-485 connector, set the slide switch on the V706 to the upper position: RS-232C/RS-485.
> For more information, refer to “Interface” (page 1-5).

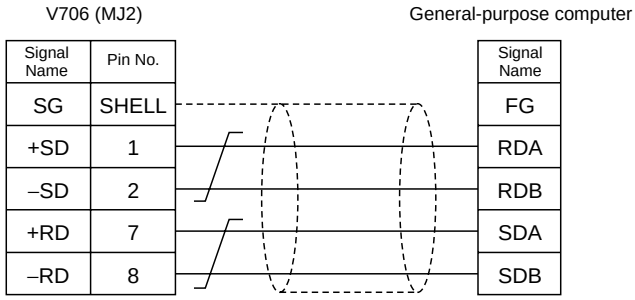


* Use twist-shielded cables.

MJ2 (V706 only) RS-422

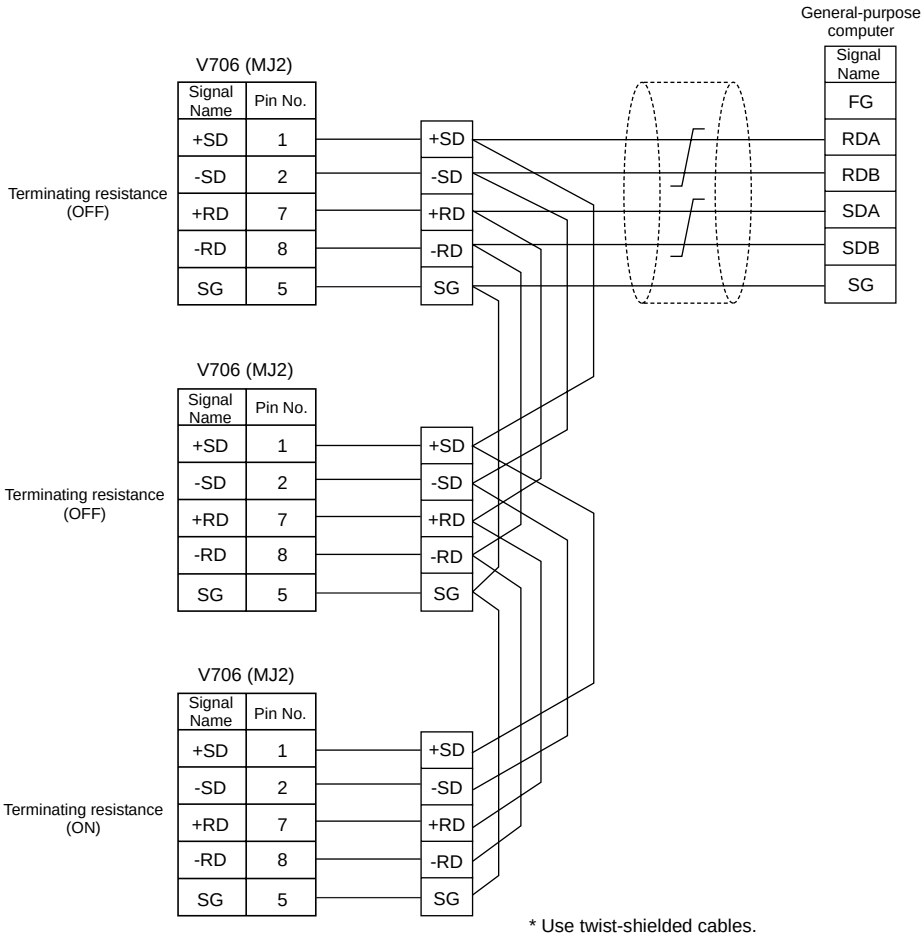
> **⚠CAUTION** To use an MJ2 on a V706 as an RS-422 (4-wire) connector, set the slide switch on the V706 to the lower position: RS-422.
> For more information, refer to “Interface” (page 1-5).

- 1 : 1 Connection



* Use twist-shielded cables.

- 1 : n Connection

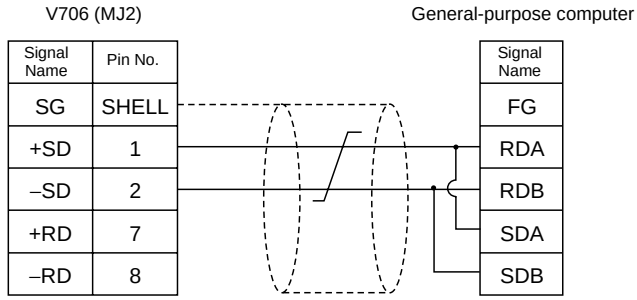


* Use twist-shielded cables.

MJ2 (V706 only) RS-485

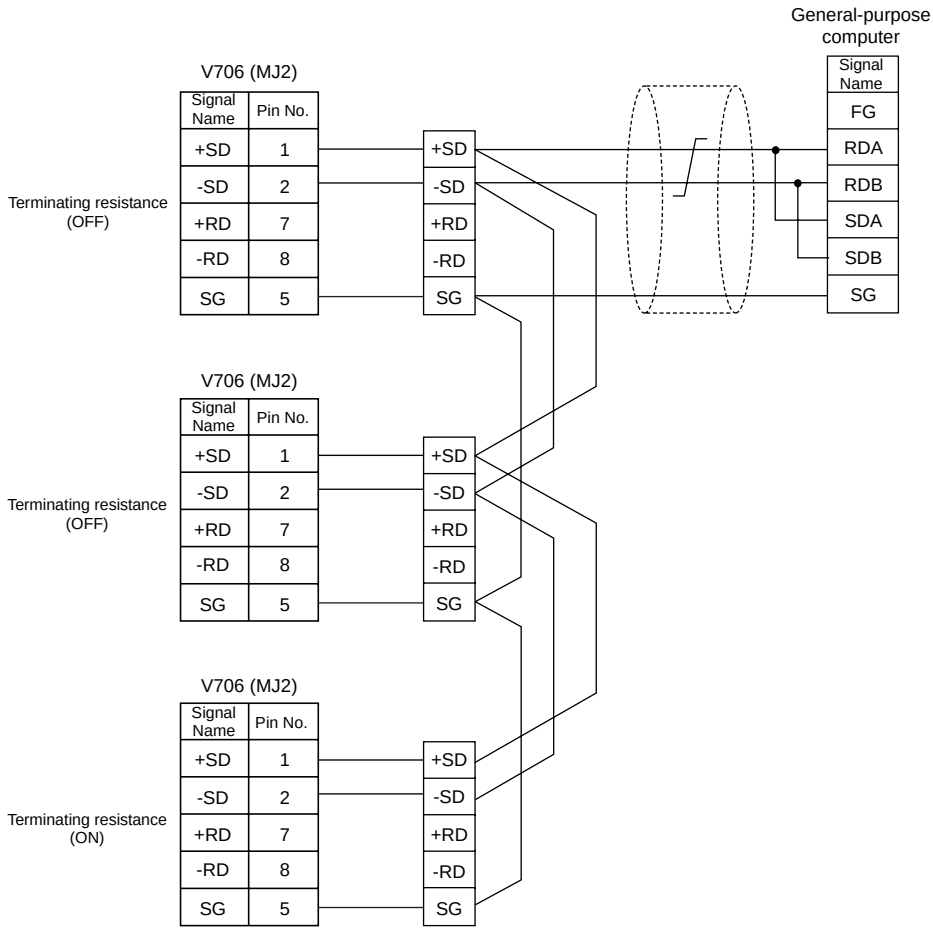
CAUTION To use an MJ2 on a V706 as an RS-485 (2-wire) connector, set the slide switch on the V706 to the upper position: RS-232C/RS-485.
For more information, refer to “Interface” (page 1-5).

- 1 : 1 Connection



* Use twist-shielded cables.

- 1 : n Connection



* Use twist-shielded cables.

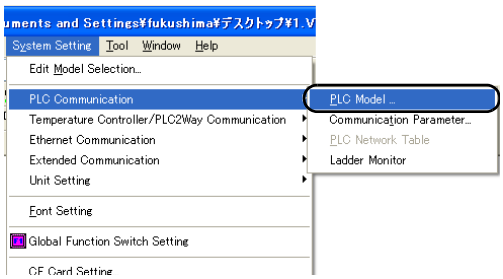
System Setting

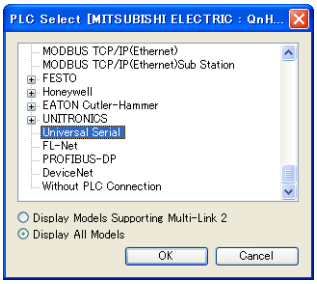
Model Setting

Select universal serial as the model that will communicate with the V series.

1) From the menu bar, go to [System Setting] and click on [PLC Model].

2) The [PLC Select] dialog comes up. Select [Universal Serial] and click the [OK] button.



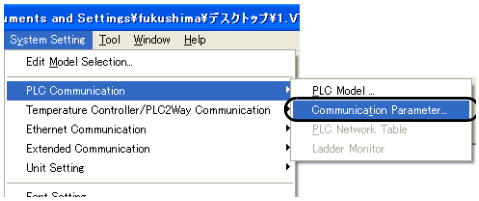


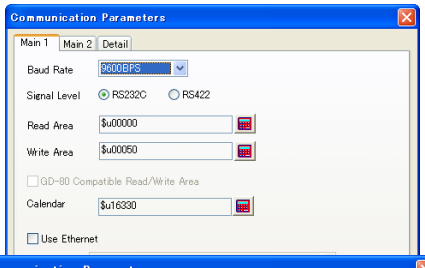
Communication Parameter

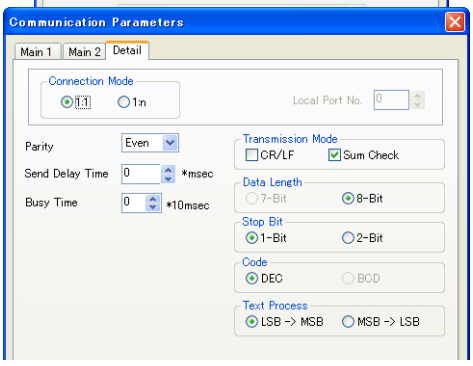
Make communication parameter settings.

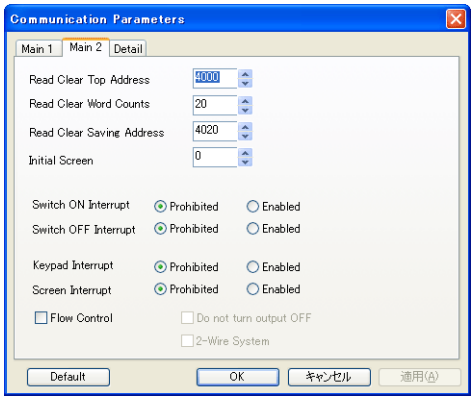
1. From the menu bar, go to [System Setting], and click on [Communication Parameter].

2. The [Communication Parameters] dialog comes up. In the [Main 1], [Main 2], and [Detail] tab windows, set the baud rate, the signal level, etc.









When using multi-drop, go to the [Detail] tab window, check [1 : n] for [Connection], and enter [Local No].
It is possible to set the transmission mode by going to the [Detail] tab window and making settings for [Trans. Mode].

Setting Items

- Baud Rate
  Set the communication speed between the host and the V series. The possible speed settings are shown below.
  4800 bps
  9600 bps
  19200 bps
  38400 bps
  57600 bps
  76800 bps
  115 kbps
- Signal Level
  Set the communication level between the host and the V series.
  RS-232C/RS-422
- Read Area
  This memory area is necessary when the display screen is changed by a command received from the host. Be sure to allocate only $u memory. Address allocation is shown in the table below. For details on addresses, refer to Chapter 1 in the Reference Manual.

Address	Name	Contents
n + 0	RCVDAT	Sub command/data
n + 1	SCRN_COM	Screen status command
n + 2	SCRN_No	External screen command

- Write Area
  This memory area is used to write information regarding screen number, overlap, and input mode when the screen display status is changed by a command received from the host. Be sure to allocate only $u memory.
  Address allocation is shown in the table below.

Address	Name	Contents
n + 0	CFMDAT	Sub command/data
n + 1	SCRN_COM	Screen status
n + 2	SCRN_No	Displayed screen
n + 3	SW0	No. 0 switch data
n + 4	SW1	No. 1 switch data
n + 5	ENT0	Entry information 0
n + 6	ENT1	Entry information 1
n + 7	ENT2	Entry information 2
n + 8	GREPNS	Global response
n + 9 ⋮ n + 15		Reserved (7 words)

For details on addresses (n + 0 to n + 2), refer to Chapter 1 in the Reference Manual.

- n + 3 (SW0) switch data No. 0, n + 4 (SW1) switch data No. 1
  When the switch output memory is set at an address location from 80 to 95 in the system memory ($s) of internal memory, the switch number is written on lower 8 bits.
  The relationship between the switch number and the bit is shown in the following table. (Refer to page App6-36.)

n + 3, n + 4 (SW0/SW1)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
	0	0	0	0	0	0	0								

Switch status
0: OFF
1: ON

Switch number

- System memory ($s) within internal memory

Address	Contents
000	Screen number
001	
002	Overlap 0 Status 0: OFF 1: ON
003	Overlap 1 Status 0: OFF 1: ON
004	Overlap 2 Status 0: OFF 1: ON
080	Universal serial port switch output 0 Output code 0 - 15
081	Universal serial port switch output 1 Output code 16 - 31
082	Universal serial port switch output 2 Output code 32 - 47
083	Universal serial port switch output 3 Output code 48 - 63
084	Universal serial port switch output 4 Output code 64 - 79
085	Universal serial port switch output 5 Output code 80 - 95
086	Universal serial port switch output 6 Output code 96 - 111
087	Universal serial port switch output 7 Output code 112 - 127
088	Universal serial port switch output 8 Output code 128 - 143
089	Universal serial port switch output 9 Output code 144 - 159
090	Universal serial port switch output 10 Output code 160 - 175
091	Universal serial port switch output 11 Output code 176 - 191
092	Universal serial port switch output 12 Output code 192 - 207
093	Universal serial port switch output 13 Output code 208 - 223
094	Universal serial port switch output 14 Output code 224 - 239
095	Universal serial port switch output 15 Output code 240 - 255

* The switch interrupt information of SW0 and SW1 is written only when the [Output Action] of a switch is [Momentary] or [Momentary W].

Example: The relationship between the switch output memory setting and the switch number is shown in the following table.

Output Memory	Switch No.
$s 080-00	0
$s 085-10	90
$s 095-15	255

- n + 5 (ENT0) entry information 0, n + 6 (ENT1) entry information 1
  The same contents as n + 0 and n + 1 of the [Info. Output Memory] that is set in the entry mode are written. Write operation occurs when the [ENTER] key is pressed in the entry mode. When the entry selection has changed, write operation will not occur.
  When (n + 5) entry information 0 is read by the host, writing completed bit (bit 15) is reset. Data is written in the backup (escape) area before it is read. (Refer to page App6-15.)

- n + 7 (ENT2) entry information 2
  The entry mode window number where a write operation was executed is written.
  The relationship between the window number and base and the window number and overlap is shown in the following table.

Window No.	Contents
0	Base entry mode
1	Overlap 0 entry mode
2	Overlap 1 entry mode
3	Overlap 2 entry mode

* In case of using the Table Data Display(s) as the entry targets of the Entry mode
The line number and the column number will be output to the address n + 1 and the block number to the address n + 2 of the “Info. Output Memory,” when the bit No.12 of “Command Memory” in the [Entry] dialog is ON [1].
In only this case, therefore, the window number cannot be referred because the block number is output to the address n + 7 (ENT2) of the write area.
Please take note of this.

- n + 8 (GREPNS) global response
  A response to a global command is written. The contents of a response are shown in the following table.

Memory Contents	Contents
0000	Global command not received
0100	ACK
Others	Identical to NAK code (Refer to page App6-37.)

- n + 9 to n + 15
  Reserved for functions expanded in the future.

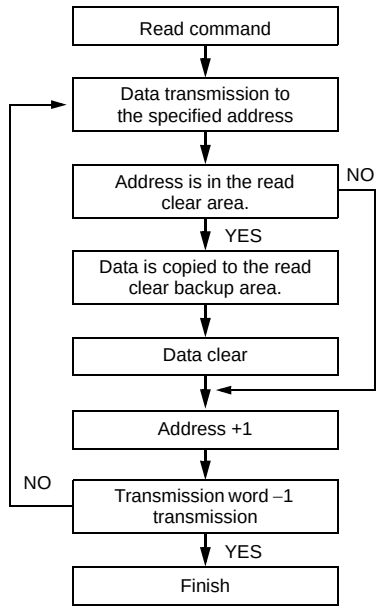
- Calendar
  The values written in the calendar area are used for the calendar display. Set the top memory number. The relationship between memory and the calendar is shown in the following table.

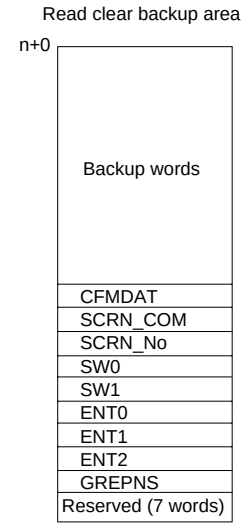
Memory	Contents
n + 0	Year (BCD 0 to 99)
n + 1	Month (BCD 1 to 12)
n + 2	Day (BCD 1 to 31)
n + 3	Hour (BCD 0 to 23)
n + 4	Minute (BCD 0 to 59)
n + 5	Second (BCD 0 to 59)
n + 6	Day of the week (BCD 0 to 6)

Calendar settings are performed in the read area under [RCVDAT (n + 0)] at the leading edge of bit 11.
The V series calendar uses the CPU clock. When precise time is necessary, set the calendar once a day. (Time loss: approximately 90 seconds a month.)

- Read Clear Top Address (Set user memory within internal memory.)
  The read clear area is the starting area from which the V series clears words that were previously read. Due to the fact that it is cleared to "0," once this area is read, the data remains at "0" even if you attempt to read again when a read response error occurs. Set the area's top address number.
- Read Clear Words
  Set the number of words that will be used for clearing the read area.
- Read Clear Escape (Backup) Address
  Set the top address for the read clear backup area. The area size will be the same as the previously described read clear area.
  The number of words written in the read clear backup area are the same as the number specified for the read clear area.

  - Read Clear and Read Clear Backup Action
    The action that occurs when a read command from the host tries to access to the read clear area is shown in the following diagram.
    Following allocation of the read clear backup area, backup data of the system memory write area is stored as shown below.

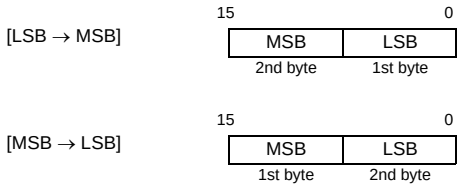




- Default Initial Screen
  Set the number of the screen to be displayed when power to the V series is turned on.

- Interrupt
  There are five interrupt settings:
  Switch ON interrupt
  Switch OFF interrupt
  Keypad interrupt
  Screen interrupt
  Macro: OUT_ENQ
  For details, refer to page App6-34.
- Execute Flow Control (disabled for V706)
  Check the [Execute Flow Control] when interrupt from V series is needed to be prohibited. (e.g. when the host cannot receive interrupt data)
  The action when you check the [Execute Flow Control] is shown below.
  - When CS (pin 4) on V series side is ON:
    Interruption is output.
  - When CS (pin 4) on V series side is OFF:
    Interruption is not output.
    When CS is ON, interruption information stored by then is output in succession.
    (Interruption information for 3 times can be stored at the most.)
- Not remain the output signal OFF
  This setting is available only for 1 : 1 communication with RS422 using four-wire.
  Normally, V series uses the same cables to send or receive data. For this reason, send output remains OFF (High impedance) except for sending signals from V series.
  However, depending on the host specifications, send output OFF operation from the V series is not required. In this case, you must check [☐ Not remain the output signal OFF].
- Execute 2 Wire Control
  This setting is available only for 1 : 1 communication with RS-422 using 2-wire.
  In such a case, however, interrupt is not usable.
- Connection
  Set the connection method for the V series and host.
  1 : 1 ..... There is one V series machine and one host.
  1 : n ..... Multiple V series units are connected to one host.
- Local Station Number
  When multiple V series machines are connected to one host, set a station number for each V series.
- Parity
  None
  Odd
  Even
- Send Delay Time
  Set the time for V series to send a response to a host after receiving a command from a host.
- Busy Time
  For details, refer to page App6-25.
- Trans. Mode
  Set whether or not there should be a CR/LF or sum check at the end of transmission data.
- Data Length
  Fixed at 8 bits.
- Stop Bit
  Stop bit settings are shown below.
  1 bit
  2 bits
- Code
  Fixed at DEC.

- Text Process
  When using text process, choose either [LSB to MSB] or [MSB to LSB] in order to make arrangements for the order of the first and the second bytes in one word.



Standard Type Protocol

Standard Type Protocol

The connection mode and transmission mode are set in [Comm. Parameters] under [System Setting]. (Refer to “1. Before Connecting to PLC.”)
The mode contents are as follows.

- Connection mode
  1 : 1: Used when one host communicates with one V series unit (1 : 1).
  1 : n: A maximum of 32 V series units are possible to be connected to the host. (Multi-drop specifications)
- Transmission mode
  There are four transmission modes, depending on whether or not sum check or CR/LF is attached to the end of transmission and received data, as shown below.

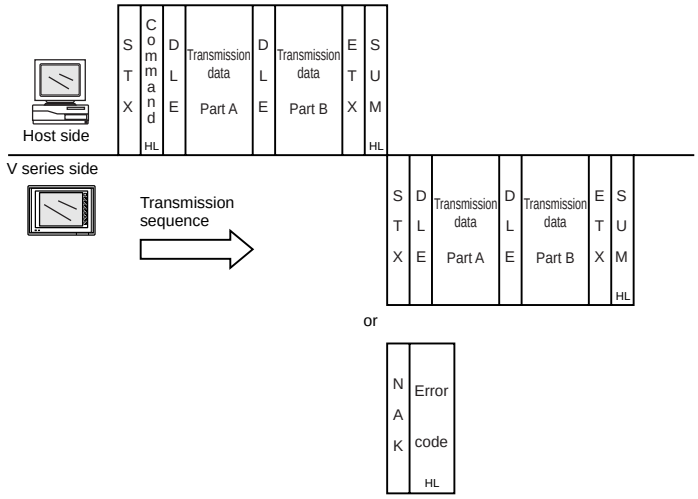
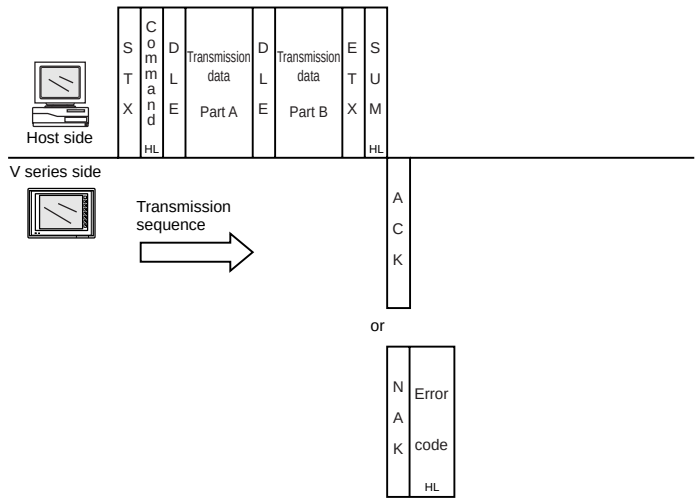
Transmission Mode	Sum Check	CR/LF
1		
2	○	
3		○
4	○	○

Set whether or not to attach sum check or CR/LF to the end of transmission data.

* “○” indicates that there is an attachment.

Connection (1 : 1), Transmission Mode (w/ sum check)

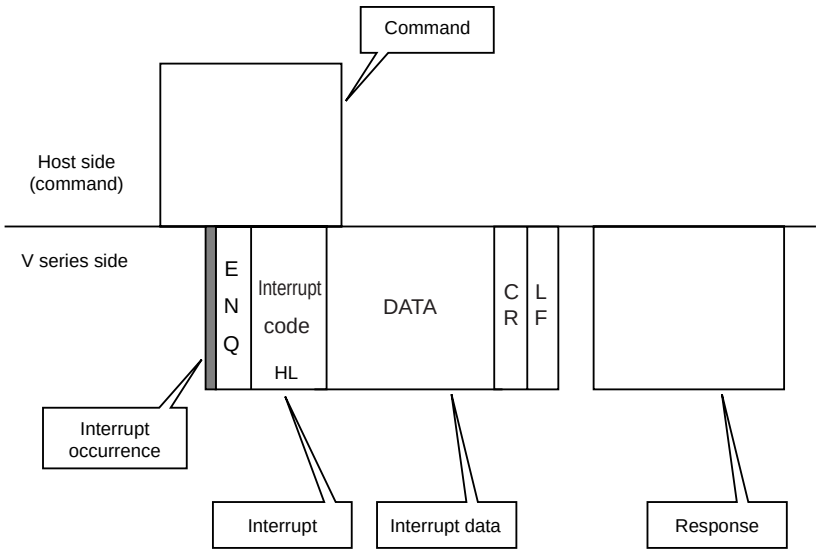
Used when one host communicates with one V series unit (1 : 1).

Contents	Protocol
When V series data is read from the host side	
When the host writes data on the V series	

<Interrupt Processing (See page App6-34 and page App6-35.)>

- Interrupt conditions
  An interrupt code is sent to the host for the following actions.
  - When the switch status changes from ON to OFF or from OFF to ON
  - When the [ENTER] switch on the keypad changes from OFF to ON. (If [☐ Use the Write Flag] in [System Setting] is checked, write enable bit must be set in order to send interruption.)
  - When the screen changes by using an internal switch
  - When OUT_ENQ in a macro command is run.

- Interrupt timing
  When an interrupt condition occurs while the host is transmitting a command or before the V series machine transmits a response, the interrupt code will be transmitted before the response is transmitted.
  To use an interrupt, it is necessary to enable interrupt code detection when a response is received on the host program.

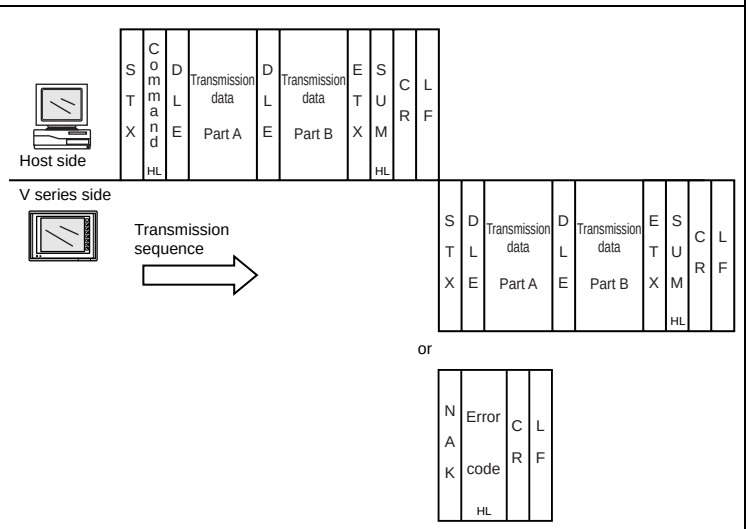
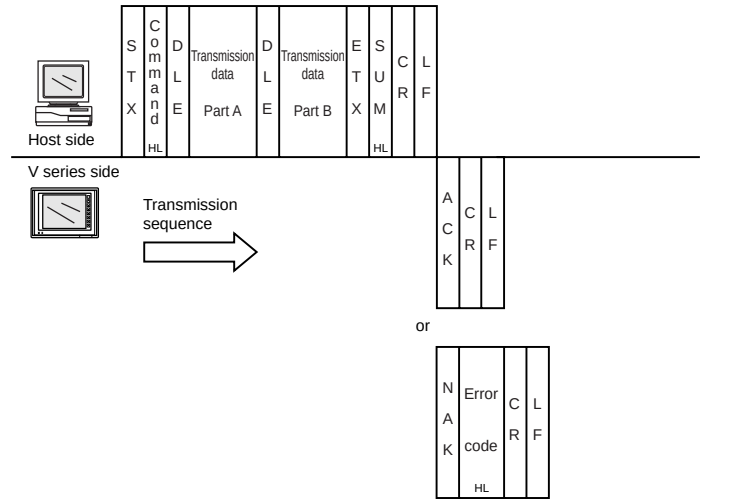


- Interrupt code

00H	When a regular switch is pressed
01H	When the [ENTER] switch on the keypad is pressed
02H	When a screen internal switching occurs
10H ⋮ 2FH	In the case of macro command (user setting)

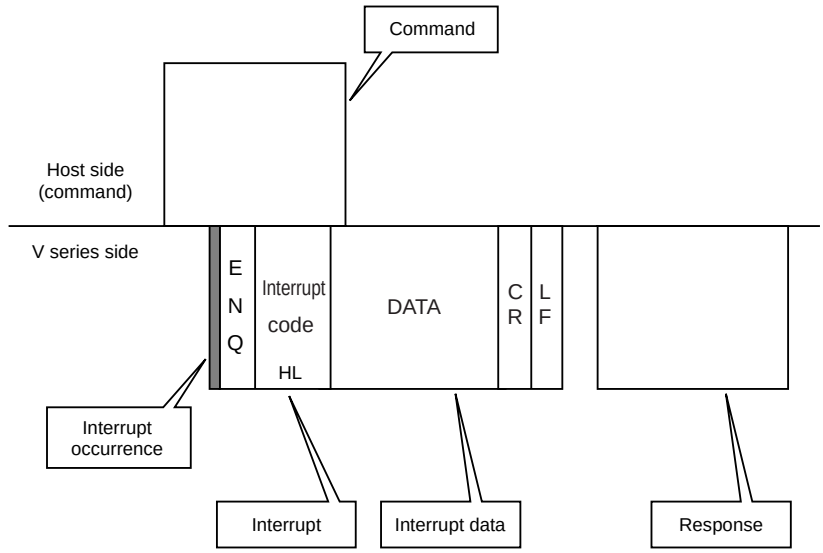
Connection (1 : 1), Transmission Mode (w/ sum check and CR/LF)

Used when one host communicates with one V series unit (1 : 1).

Contents	Protocol
When V series data is read from the host side	
When the host writes data on the V series	

<Interrupt Processing (See page App6-34 and page App6-35.)>

- Interrupt conditions
  An interrupt code is sent to the host for the following actions.
  - When the switch status changes from ON to OFF or from OFF to ON
  - When the [ENTER] switch on the keypad changes from OFF to ON. (If [☐ Use the Write Flag] in [System Setting] is checked, write enable bit must be set in order to send interruption.)
  - When the screen changes by using an internal switch
  - When OUT_ENQ in a macro command is run.
- Interrupt timing
  When an interrupt condition occurs while the host is transmitting a command or before the V series machine transmits a response, the interrupt code will be transmitted before the response is transmitted.
  To use an interrupt, it is necessary to enable interrupt code detection when a response is received on the host program.

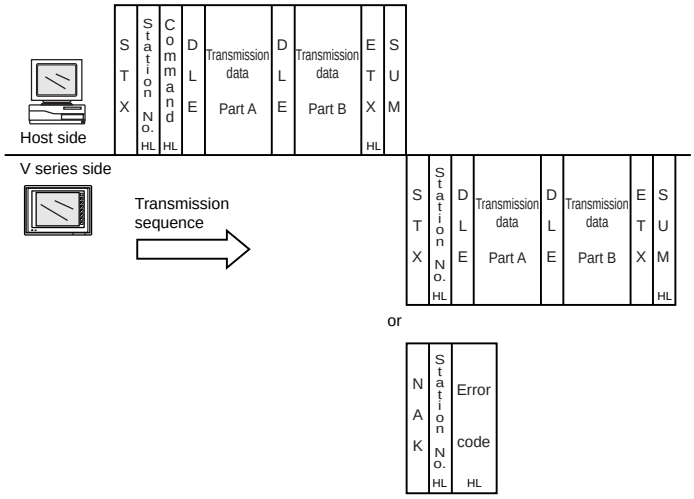
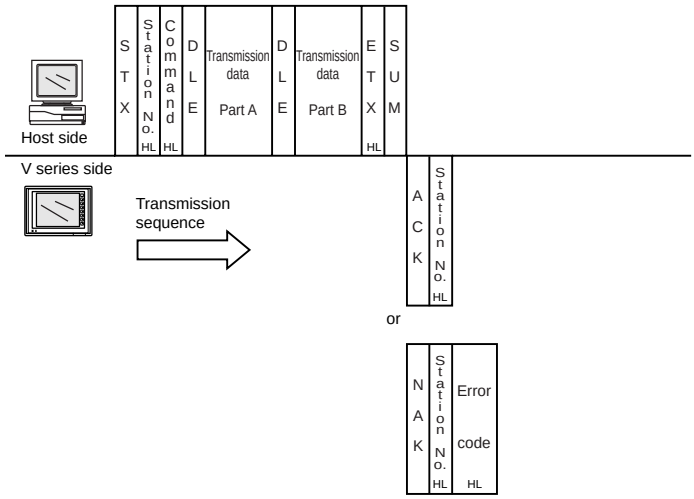


- Interrupt code

00H	When a regular switch is pressed
01H	When the [ENTER] switch on the keypad is pressed
02H	When a screen internal switching occurs
10H ⋮ 2FH	In the case of macro command (user setting)

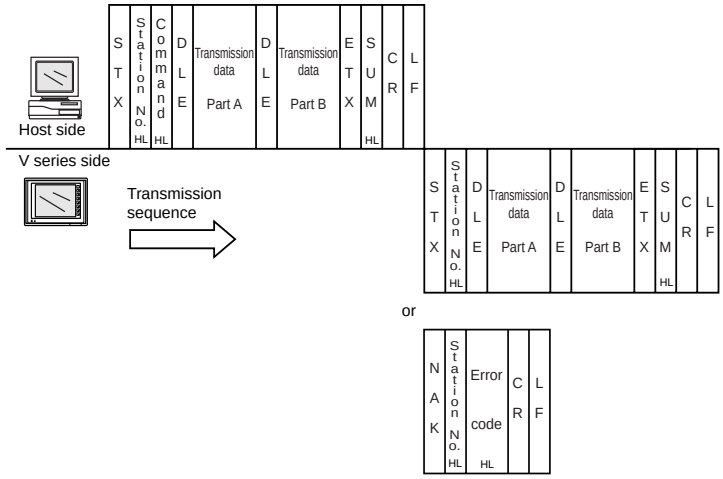
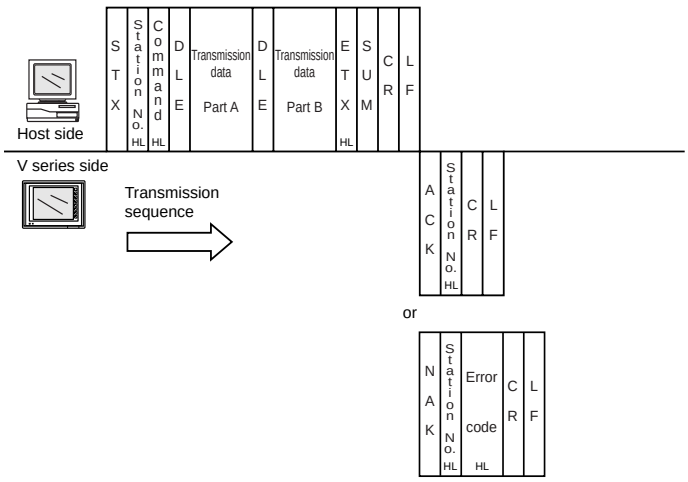
Connection (1 : n), Transmission Mode (w/ sum check)

It is possible to attach as many as 32 V series units to one host.
(For information on the global command, refer to page App6-26.)

Contents	Protocol
When V series data is read from the host side	
When the host writes data on the V series	

Connection (1 : n), Transmission Mode (w/ sum check and CR/LF)

It is possible to attach as many as 32 V series units to one host.
(For information on the global command, refer to page App6-26.)

Contents	Protocol
When V series data is read from the host side	
When the host writes data on the V series	

Data Items for Protocols

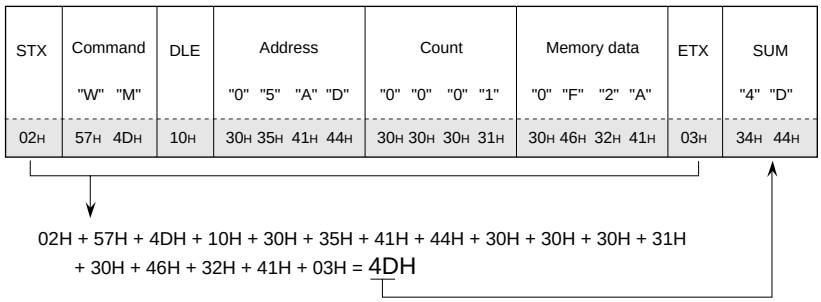
- Transmission control code
  The transmission control codes are shown in the table below.

Signal Name	Code (Hexadecimal)	Contents
STX	02H	Start of transmission block
ETX	03H	End of transmission block
ENQ	05H	Interrupt
ACK	06H	Positive acknowledge
CR	0DH	Carriage return
DLE	10H	Change contents within a block
NAK	15H	Negative acknowledge
LF	0AH	Line feed

- Port number
  Port numbers are used so that the host computer can identify each V series for access. The data range is from 00H to 1FH (0 to 31) and is converted into two-digit ASCII code (HEX) before use. The port number of the V series should be set on the V-SFT editor.

- Sum check code (SUM)
  Data is added up (SUM), and the lower one byte (8 bits) of the sum is converted into the 2-digit ASCII code (hexadecimal). A sum check code is shown below.

  Example: Sum check will be as is shown below when data is transmitted as: command [WM] (data writing), address [05AD] (1453), and memory data [OF2A] (3882) in transmission mode [w/o CR/LF, w/ sum check].



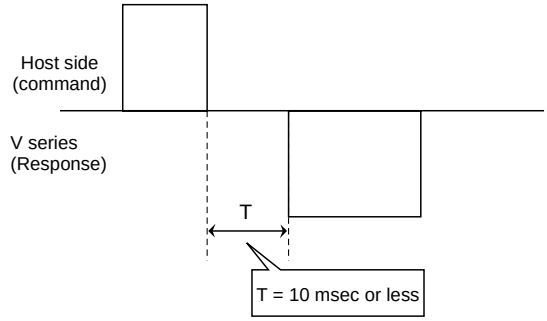
  However, in the case of an interrupt, data from ENQ to ETX is subject to a sum check.

- Error code
  An error code is sent along with an NAK response.
  An error code is transmitted as a two-digit ASCII code (HEX). For more information, refer to page App6-37.

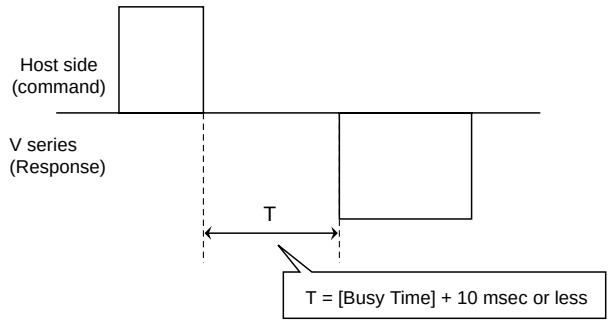
Response Time and BUSY

Response time varies depending on the type of command.

- RM / RI / RC
  These commands immediately send a response once receipt of data is complete.
  No NAK [01] (BUSY) signal is given.



- WM / TR / WI / WC
  Once receipt of data is complete, these commands first check the display status. If the display status is found to be complete, a response is sent and a command is executed.
  If the status is BUSY and the display is completed within the time set in [Busy Time], a response is sent.
  If the display is not completed within the specified time, an NAK [01] (BUSY) signal is sent. In this case, it is necessary to retransmit the command.
  When [Busy Time] is set as [0], the machine waits until the display is complete, and then a response is transmitted after a command is executed.



Command

- Command
  Available commands are shown below.

Signal Name	Name	Contents
RM	Read	Read data memory
WM	Write	Write data memory
TR	Retry	Retry when NAK [01] is BUSY
WI	Interrupt Setting	Allow interrupt (Connection mode 1 : 1)
RI	Read Interrupt Status	Read interrupt setting status (Connection mode 1 : 1)
RC	Read CHR	Read data memory as characters
WC	Write CHR	Write data memory as characters

Global Port Number (FFH)

Active for connection mode (1 : n).
When the port number is set as [FFH] and a command is executed, all V series units that are connected send a response in reply to a command from the host.

Commands for which global port number are active are shown below. If commands other than these are used, a command error will occur.

Signal Name	Name	Contents
WM	Write	Write data memory
WC	Write CHR	Write data memory as characters

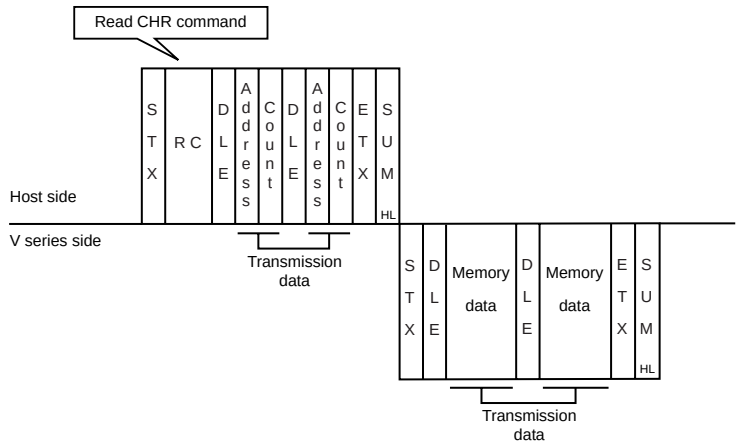
Responses to global port numbers are not transmitted to the host. However, responses are written in write area (n + 8) as shown below.

Memory Contents	Contents
0000H	Global command not received
0100H	ACK
Others	Identical to NAK code (See page App6-37.)

Read CHR Command

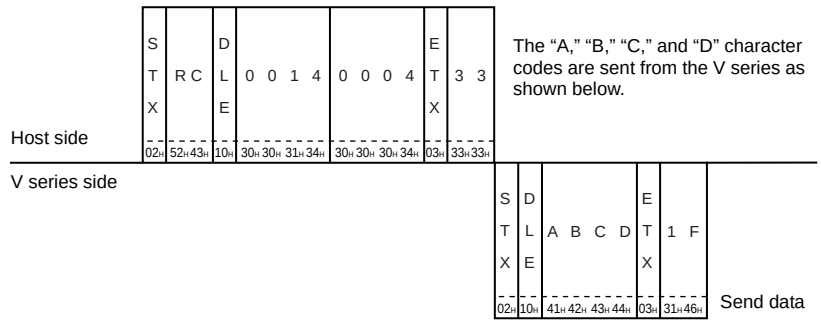
When memory contents are in the form of characters when data is read, 1 character (1 byte) is converted into 2-byte ASCII code and transmitted. However, when this command is used, contents are not converted before transmission, and thus, the transmission time is decreased by approximately 1/2.

- Read CHR command



- Host side
  There should be no more than 5 DLEs.
  Address: Top address of the data memory to be read (HEX ASCII)
  Count: Number of characters to be read (HEX ASCII)
  * When the data to be read is not continuous, “DLE” is inserted as a delimiter between the breaks.
- V series side
  Address and count are omitted and DLE and data are transmitted.

Example: Address: Call up 4 characters that are written at the top of 0020 (0014H).

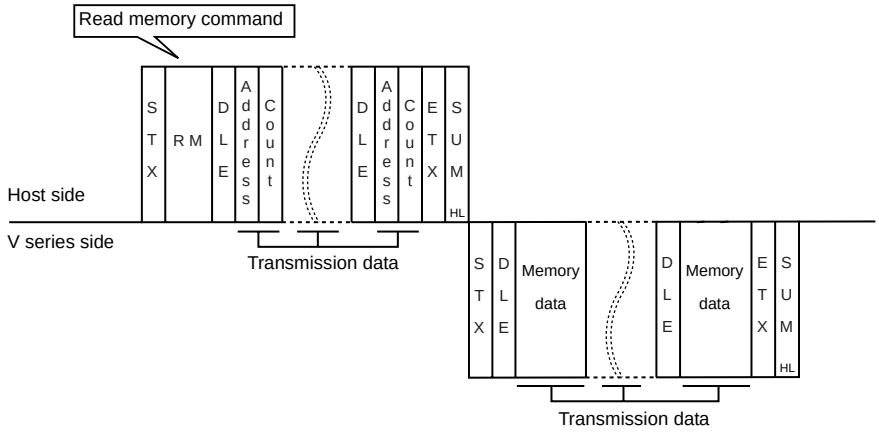


The “A,” “B,” “C,” and “D” character codes are sent from the V series as shown below.

Read Memory Command

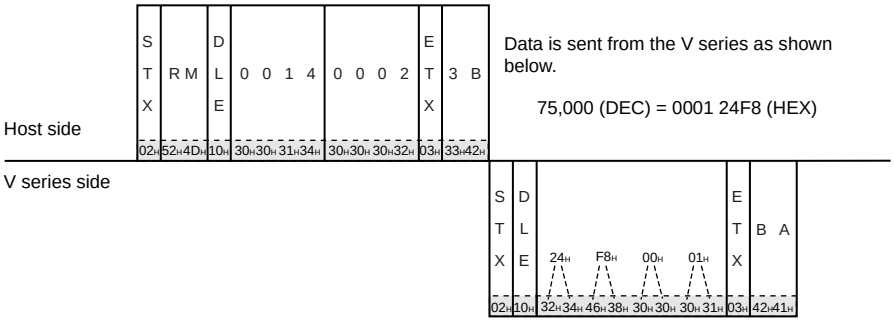
Note: Due to the fact that communication speed is increased when you use the read CHR command to read characters, it is recommended that you use this command.

- Read memory command



- Host side
  There should be no more than 5 DLEs.
  Address: Top address of the data memory to be read (HEX ASCII)
  Count: Number of characters to be read (HEX ASCII)
  * When the data to be read is not continuous, “DLE” is inserted as a delimiter between the breaks.
- V series side
  Address: Top address of the data memory to be read (HEX ASCII)
  Count: Amount of data memory to be read (HEX ASCII)
  The read sequence is the same as the command sequence (HEX ASCII).

Example: Address: Read the double-word data “75,000” (DEC) contained in the address 0020 (0014H).



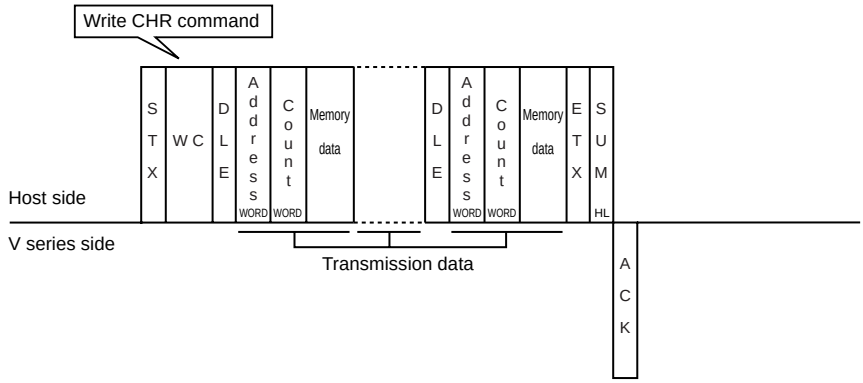
Data is sent from the V series as shown below.

75,000 (DEC) = 0001 24F8 (HEX)

Write CHR Command

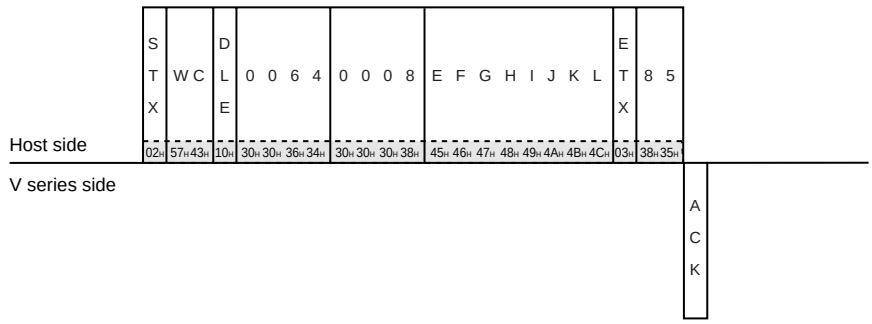
When memory contents are in the form of characters, it is necessary to use a write command to convert 1 character (1 byte) into 2 byte ASCII code and then transmit. However, with this command contents are transmitted just as they are, and consequently, the transmission time is decreased by 1/2. (Character codes from 00 to 1F cannot be used.)

- Write CHR command



- Host side
  There should be no more than 5 DLEs.
  Address: Address of the memory to be written (HEX ASCII)
  Count: Number of write characters (HEX ASCII)
  Memory data: Data to be written
  * When write data is not continuous, “DLE” is inserted as a delimiter between the breaks.

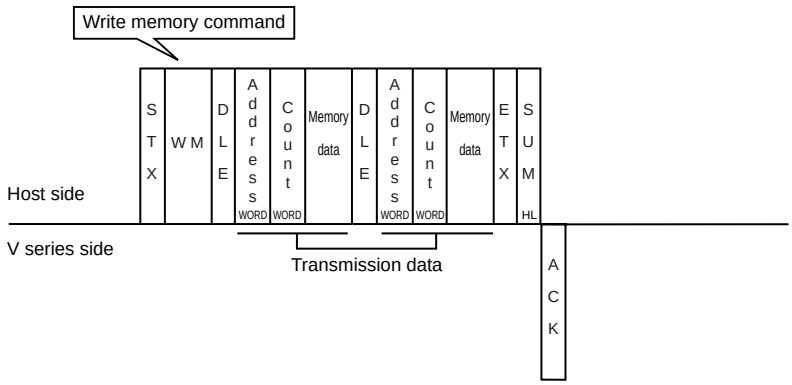
Example: Send data to display the following characters on the V series.
Address: 0100 (0064H), EF
Address: 0101 (0065H), GH
Address: 0102 (0066H), IJ
Address: 0103 (0067H), KL



Write Memory Command

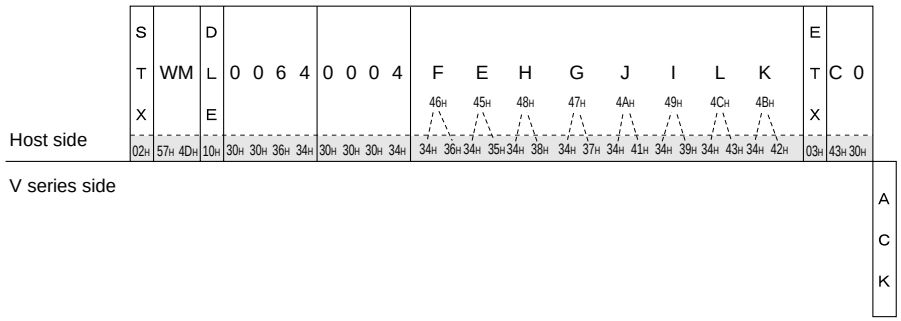
Note: Due to the fact that communication speed is increased when you use the write CHR command to write characters, it is recommended that you use this command.

- Write memory command



- Host side
  There should be no more than 5 DLEs.
  Address: Address of the memory to be written (HEX ASCII)
  Count: Data memory contents to be written (HEX ASCII)
  * When write data is not continuous, “DLE” is inserted as a delimiter between the breaks.

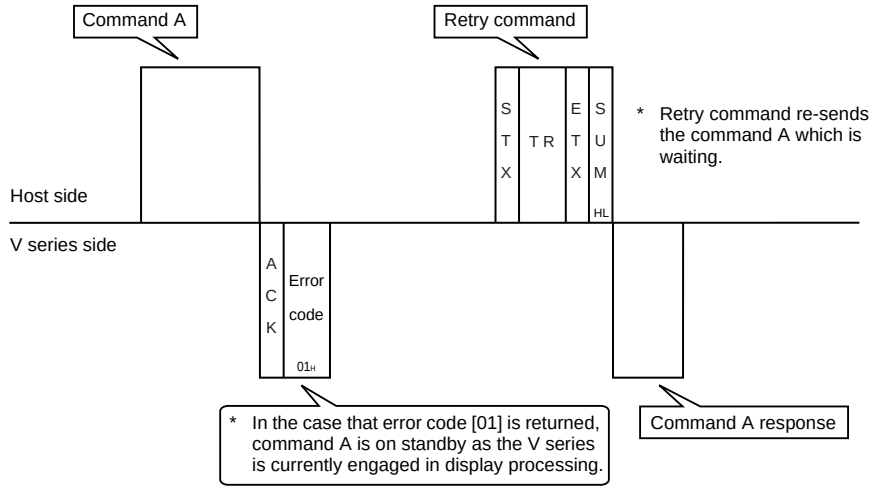
Example: Send data to display the following characters on the V series.
Address: 0100 (0064H), EF (= 4645 H)
Address: 0101 (0065H), GH (= 4847 H)
Address: 0102 (0066H), IJ (= 4A49 H)
Address: 0103 (0067H), KL (= 4C4B H)



Retry Command

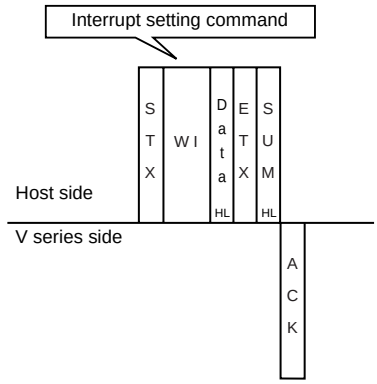
Use this command when a write command/write CHR command is sent and an NAK error code [01] is returned.

- Retry command



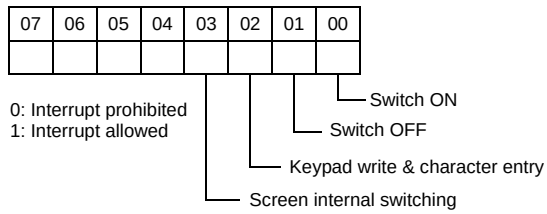
Interrupt Setting Command

- Interrupt setting command



- Host side
  Interrupt conditions can be specified when the interrupt data bit is set.
  DataInterrupt status (HEX ASCII)

  <Interrupt Conditions>

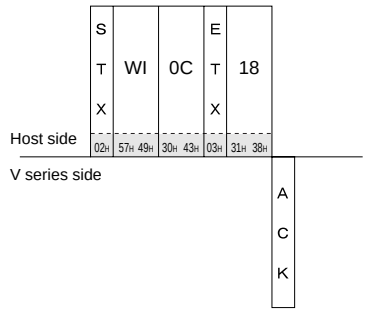


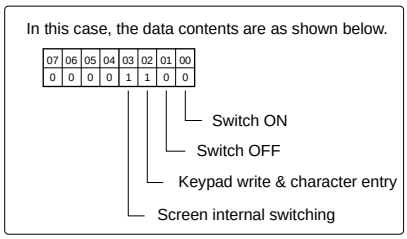
Switch ON:	Interrupt when the switch changes from OFF to ON (only when [Action] of the switch is [Normal], [Block], [+Block], [–Block] or [Mode])
Switch OFF:	Interrupt when the switch changes from ON to OFF (only when [Action] of the switch is [Normal], [Block], [+Block], [–Block] or [Mode])
Keypad write:	Interrupt when the [ENTER] switch on the keypad is pressed
Screen internal switching:	Interrupt when the screen changes based on an internal switch

* Macro (OUT_ENQ): Interrupt enabled all the time

Example: Interrupt settings are shown below.

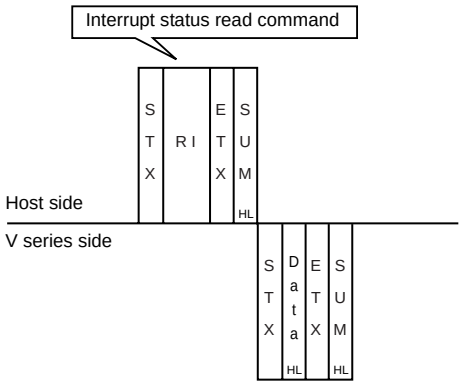
Switch ON:	Prohibited
Switch OFF:	Prohibited
Keypad/character entry write:	Allowed
Screen internal switching:	Allowed



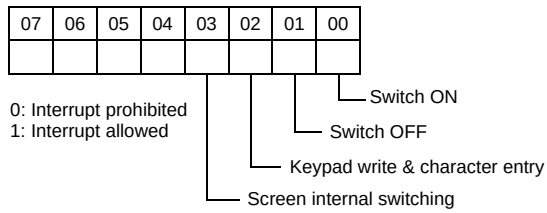


Interrupt Status Read Command

- Interrupt status read command

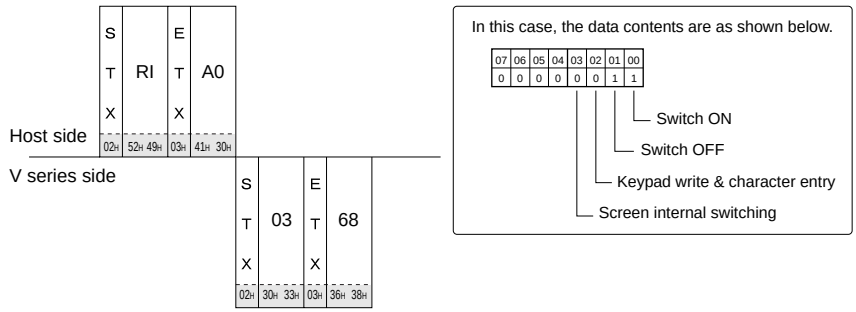


- Host side
  Interrupt status is read.
  Data: Interrupt status (HEX ASCII)



Example: Interrupt status is read.

Switch ON:	Allowed
Switch OFF:	Allowed
Keypad/character entry write:	Prohibited
Screen internal switching:	Prohibited



Interrupt (ENQ)

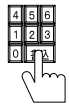
When interrupt is used when the connection mode is (1 : 1)*, this code is transmitted.
The transmission occurs when a regular key is pressed or when the [ENTER] key is pressed in the entry mode. (For information on interrupt timing, refer to page App6-19.)
Interrupt data becomes the contents of write areas n + 2 to n + 7. (Refer to page App6-12.)

* For RS-422 (485) 2-wire connection, interrupts cannot be used.

When a regular key is pressed

V series side

ENQ	00	Screen No.	SW0	SW1	ENT0	ENT1	ENT2	ETX	SUM
		WORD	WORD	WORD	WORD	WORD	WORD		HL



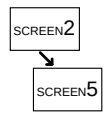
When the [ENTER] switch on the keypad is pressed

When the [ENTER] switch on the keypad is pressed

V series side

ENQ	01	Screen No.	SW0	SW1	ENT0	ENT1	ENT2	ETX	SUM
		WORD	WORD	WORD	WORD	WORD	WORD		HL

ENT0/1/2 is the same as system memory area (n + 5, n + 6, n + 7)

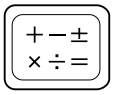


When a screen internal switching occurs

V series side

ENQ	02	Screen No.	SW0	SW1	ENT0	ENT1	ENT2	ETX	SUM
		WORD	WORD	WORD	WORD	WORD	WORD		HL

It is possible to use a macro command to initiate an interrupt.
There are two ways to use a macro command to transmit data. You can either convert the data into HEX code and transmit it, or you can transmit the data just as it is without converting it.
Use the macro command (OUT_ENQ). For details, refer to Chapter 13 in the Reference Manual (Function).



Interrupt with a macro command (OUT_ENQ)

Word transmission

V series side	ENQ	XX	00	Transmission memory address WORD	Number of transmission words WORD	Word data	ETX	SUM HL

Word transmission

Interrupt code (10H to 2FH)

Character transmission

V series side	ENQ	XX	01	Transmission memory address WORD	Number of transmission characters WORD	Word data	ETX	SUM HL

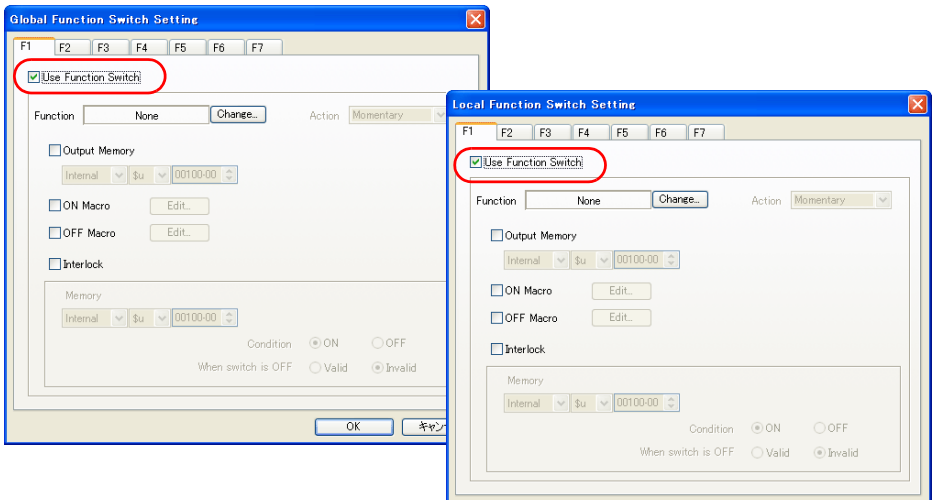
Character transmission

Interrupt code (10H to 2FH)

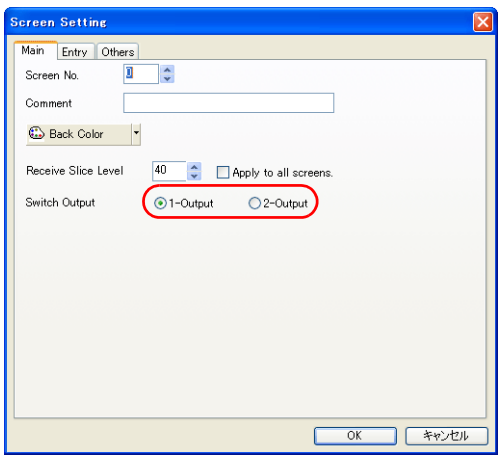
Switch Output (See page App6-13, page App6-19 and page App6-34.)

When [Output Action] of a switch is set to [Momentary] and [Output Memory] is set in location ($s80-95) of system memory, the following actions occur when the switch is pressed.
When the bit memory specified in system memory is set, and the switch is released, it is reset.
The switch number that corresponds to the bit is written in write areas n + 3 and n + 4.
For the relationship between the bit and the switch number, refer to page App6-42.

- V series analog type
  Normally, only one switch can be pressed. (Fixed to 1 output)
  However, if you go from the menu bar to [System Setting] to [Global Function Switch Setting] (or if you go from the menu bar to [Screen Setting] to [Local Function Switch Setting]), and check [Use Function Switch], it is possible to press two points (2 outputs) at the same time.
  For 1 output ([Use Function Switch] is not checked), the switch number and switch information are written in n + 3. For 2 outputs ([Use Function Switch] is checked), the switch number and switch information are written in n + 3 and n+ + 4 when two points are pressed.



- V series matrix type
  When you go from the menu bar to [Edit] to [Screen Setting], you can select between 1output or 2 outputs. For 1 output, the switch number and switch information are written in n + 3. For 2 outputs, the switch number and switch information are written in n + 3 and n + 4 when 2 switches are pressed simultaneously.



The switch number is written in the following way in write areas n + 3 and n + 4.

n + 3, n + 4 (SW0/SW1)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
	0	0	0	0	0	0	0								

Switch status
0: OFF
1: ON

Switch number

When the MONITOUCH is connected to the host in a 1 : 1 connection, interrupt occurs as is shown below.

* For RS-422 (485) 2-wire connection, interrupts cannot be used.

When a regular key is pressed

V series side

E N Q	00	Screen No.	SW0	SW1	ENT0	ENT1	ENT2	E T X	S U M
		WORD	WORD	WORD	WORD	WORD	WORD		HL

NAK

Error Codes

01H: The V series is currently engaged in display processing.
The received command is on standby due to display processing.
Wait a few moments and re-transmit the command.

02H: Overrun/Framing error
An overrun or framing error is detected in the received data.
Send the command again.

03H: Parity error
A parity error is detected in the received data.
Send the command again.

04H: Sum check error
A sum error occurs with the received data.

05H: Address error
The address specified by the memory read/write command is incorrect.
Check the address or counter and re-transmit the command.

06H: Count error
The memory read/write count is “0.”

07H: Screen error
The data to be written in read area n + 2 (screen status command), as specified by a write command, is not registered on the screen.
Check the screen number and re-transmit the data.

08H: Format error
The number of DLEs is 0 or greater than 6.

09H: Received data over
The number of write command data received from the host exceeded that of data shown below.
- Write memory command = 512 words
- Write CHR command = 1024 bytes

0BH: Retry command error
When a retry command is received, there is no BUSY status (NAK [01]) command.

0FH: ETX error
No ETX code is found.

10H: DLE error
There is no DLE code.

11H: Character error
A character not used in the received data is found. (other than 0 to F)
Check the character and send the command again.

12H: Command error
An invalid command is given.

1-byte Character Code List

Upper

Lower	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0	@	P	’	p								
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			’	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	¥	l	|								
D			-	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	■								

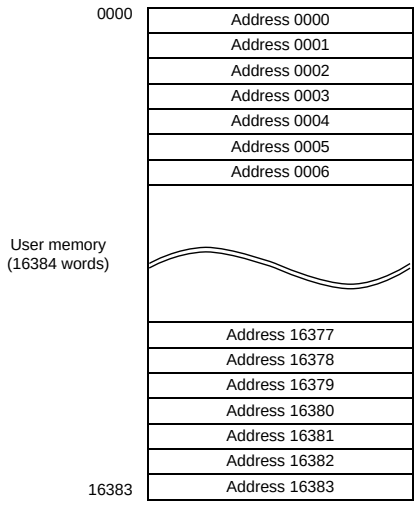
Memory Map

Memory

Inside the V series, there is internal memory necessary for screen display called “user memory ($u),” as well as memory that the V series uses for the system called “system memory ($s).”

User Memory ($u)

16384 words are available for user memory. This area is usable as desired for screen data. Also the host computer can write to and read from the area.
The memory map is as shown below.



System Memory ($s)

System memory is memory that writes V series action status when the V Series is currently displaying something.
With this written information, it is possible to check overlap status, buffer area, printer, backlight, and slave station status in multi-drop connection mode.

* System memory cannot be read or written from the host computer.

In the table below, a small part ($s80 to 95) of system memory is extracted. For more information on other areas of system memory, refer to Appendix 1 in the Reference Manual (Function).

Address	Contents		
:			
79			
80	Universal serial port switch output 0	Output code	0 - 15
81	Universal serial port switch output 1	Output code	16 - 31
82	Universal serial port switch output 2	Output code	32 - 47
83	Universal serial port switch output 3	Output code	48 - 63
84	Universal serial port switch output 4	Output code	64 - 79
85	Universal serial port switch output 5	Output code	80 - 95
86	Universal serial port switch output 6	Output code	96 - 111
87	Universal serial port switch output 7	Output code	112 - 127
88	Universal serial port switch output 8	Output code	128 - 143
89	Universal serial port switch output 9	Output code	144 - 159
90	Universal serial port switch output 10	Output code	160 - 175
91	Universal serial port switch output 11	Output code	176 - 191
92	Universal serial port switch output 12	Output code	192 - 203
93	Universal serial port switch output 13	Output code	208 - 223
94	Universal serial port switch output 14	Output code	224 - 239
95	Universal serial port switch output 15	Output code	240 - 255
96			
97			
:			

- Address 0080 to 0095
  The [Output Memory] of a switch is assigned to bits in this area.
  Set [Output Action] to [Momentary].
  When a switch is pressed, bit memory is set to “1” and the corresponding switch number is written in system setting areas n + 3 and n + 4. (Refer to page App6-13.)
  The relationship between the bit and the switch number is shown in the following diagram.

  For details about the output of a switch, refer to page App6-36.

	MSB															LSB
Address 0080	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Switch number	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

	MSB															LSB
Address 0081	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Switch number	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16

	MSB															LSB
Address 0090	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Switch number	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160

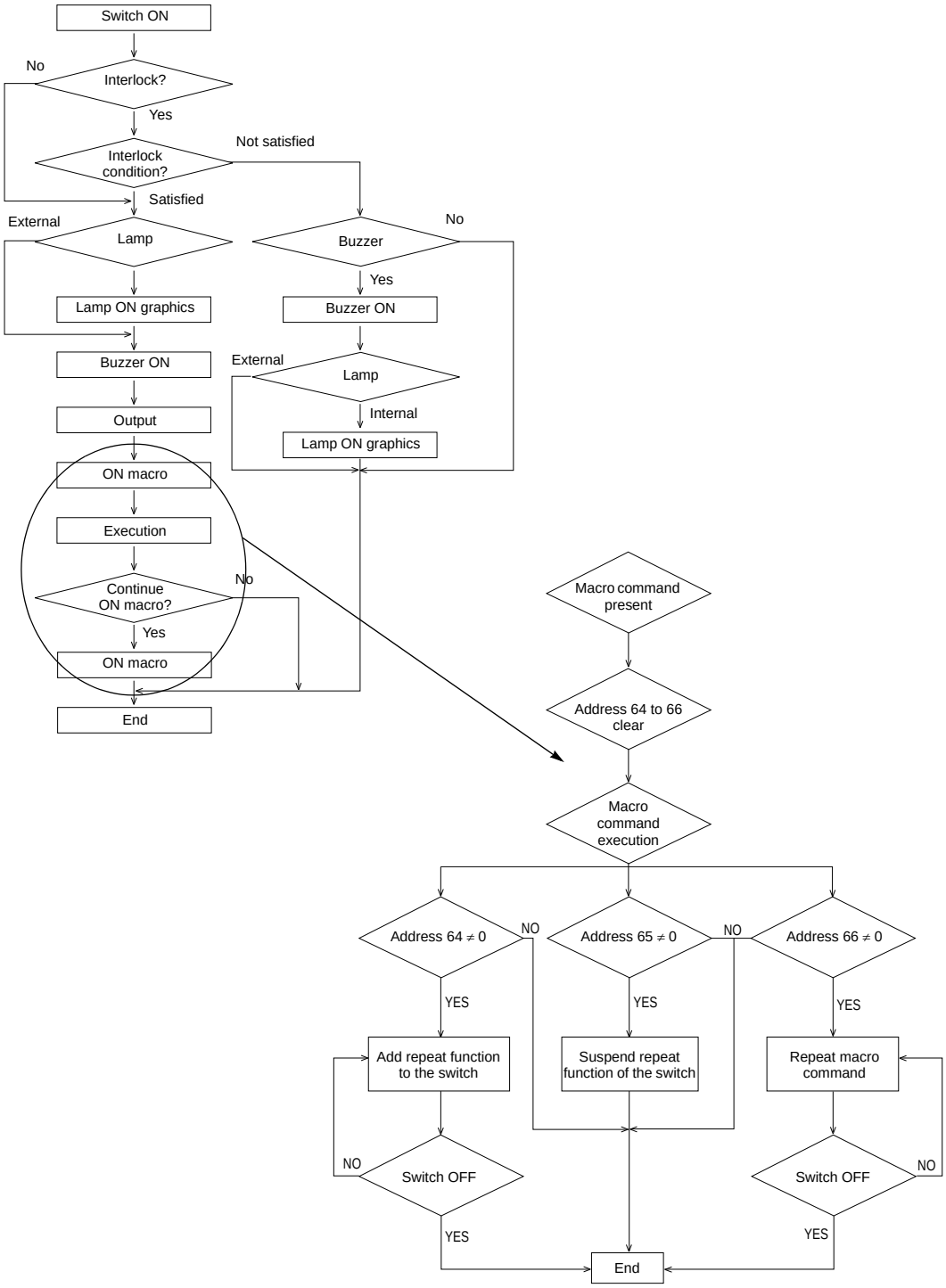
	MSB															LSB
Address 0094	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Switch number	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224

	MSB															LSB
Address 0095	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Switch number	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

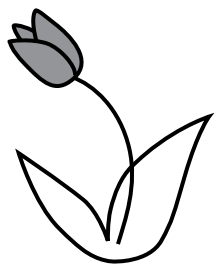
Switch ON Macro Action

The macro command that controls a repeat function in the switch ON macro, as well as the processing sequence, is shown in the following diagram.

Switch action flowchart



MEMO

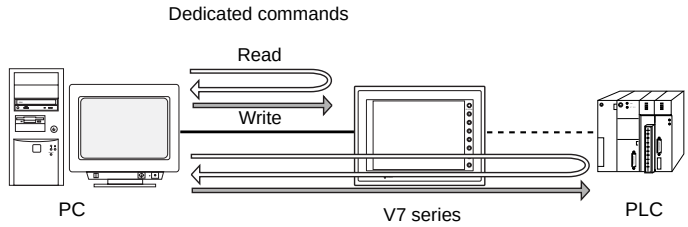


Please use this page freely.

Appendix 7 V-Link

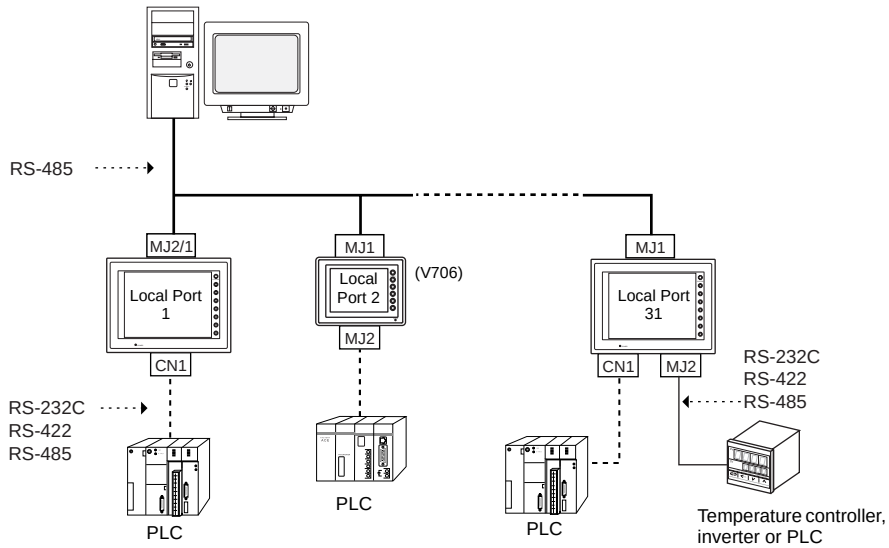
V-Link

- "V-Link" is the network where the computer reads from and writes to the internal memory of the V7 series, memory card, PLC memory or temperature control/PLC2 memory using a dedicated protocol.



- Connection with computer
  When connecting to the V7 series or a V706 equipped with DU-01, use the MJ1 port. For connection to the PLC using a temperature controller or the PLC2Way function, use the other MJ port and use CN1 for communications with the PLC. Data of the PLC or temperature controller can be collected through communications with the V7 series. Data collection is available even between the products of different manufacturers.
  When connecting to the V7 series or a V706 equipped with DU-01, use the MJ port.
- Either signal level RS-232C or RS-485 can be selected.
  With RS-232C, one V7 series can be connected; with RS-485, a maximum of 31 V7 series can be connected.

<RS-485 connection>



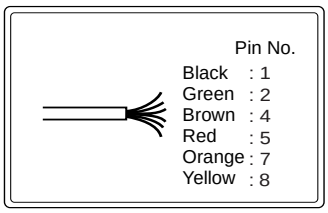
Wiring

Cable

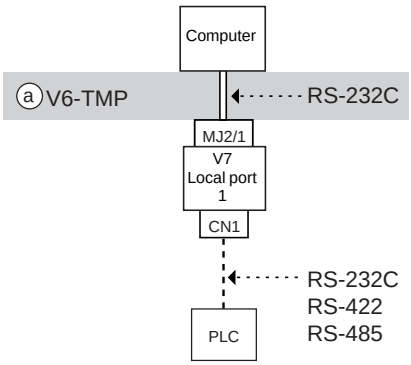
Use Hakko Electronics' cable "V6-TMP" (3, 5, 10 m) for connection with a computer.
The shielded cable of V6-TMP is connected to FG (frame ground) when the V7 series is used and to SG (signal ground) when the V706 is used.

* Notes on Use of V6-TMP
There are six wires in the V6-TMP cable as shown on the right.
The wires to be used are determined depending on the connecting method. For the wires not used, be sure to properly insulate with tape, etc.

V6-TMP



RS-232C (V7 series: 1 set)



Wiring example of above (a)

Modular jack, 8-pin

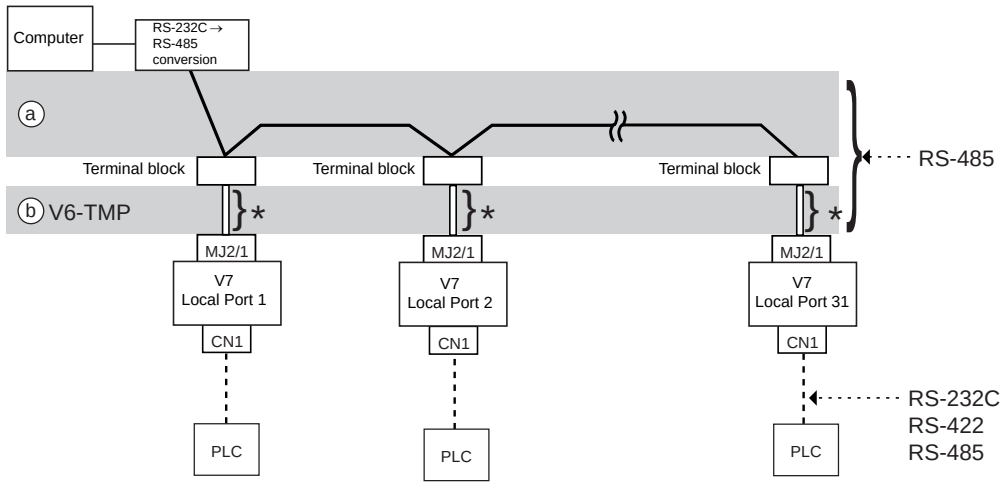
Signal Name	Pin No.
*1	
SD	8
RD	7
SG	5

Computer
D-sub 9-pin (female)

Signal Name	Pin No.
RD	2
SD	3
SG	5
DR	6
RS	7
CS	8

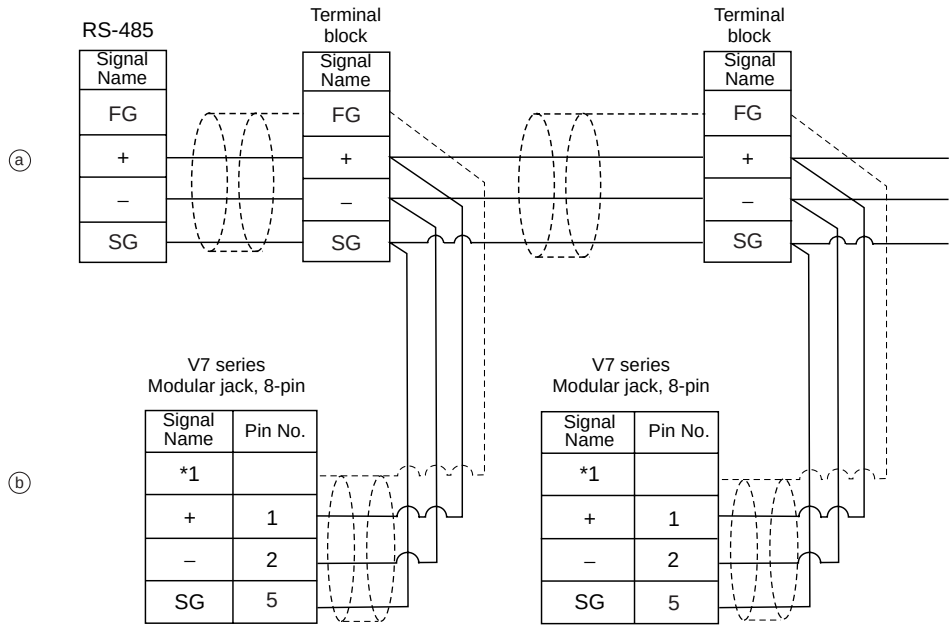
*1 V6-TMP is connected to FG when the V7 series is used and to SG when the V706 is used.

RS-485 (V7 series: maximum 31 sets)



* 0.5 m recommended (1.0 m maximum)

Wiring example of above (a) and (b)



*1 V6-TMP is connected to FG when the V7 series is used and to SG when the V706 is used.

V-SFT Setting

The V-SFT settings required for V-Link are explained.

V-Link Setting

1. Click [System Setting] → [Extended Communication] → [V-Link].
2. The [Modular Jack] dialog is displayed.
3. Select [V-Link] for Modular Jack 1 or 2 to bu used for V-Link and click [OK].
4. Make the setting for communications between the V7 series and the computer.
   [Refer to Modular]
   Select the modular jack to be used.
   Modular Jack 1/Modular Jack 2

   [Baud Rate]
   4800 / 9600 / 19200 / 38400 / 57600 / 115k bps

   [Local Port No.] (1 to 31)
   Set the port number of the V7 series.

   [Send Delay] (msec)
   Set a time delay in sending a response after receipt of data.

   [Parity]
   None/Odd/Even

   [Signal Level]
   RS-232C / RS-485
   With RS-232C, one V7 series can be connected; with RS-485, a maximum of 31 V7 series can be connected.

   [Data Length]
   7-bit/8-bit

   [Stop Bit]
   1-bit/2-bit

   [Use Sum Check]
   Check this option when using a sum check.

   [Add CR/LF]
   Check this option when adding CR/LF.

   [Set Local Port No. on Main Menu]
   Check this option when making a local port No. on [Local Main Menu].

Protocol

Read (with sum check and CR/LF)

Read command

Command

STX	V7 local No.	Read command	Number of words to read	* Read target memory setting	ETX	SUM	CR	LF
1	2	2	2	18	1	2	1	1

Bytes

Response (Normal communication)

STX	V7 local No.	ACK	Memory data 0		Memory data n	ETX	SUM	CR	LF
1	2	2	4		4	1	2	1	1

Bytes

(When an error occurs)

STX	V7 local No.	NAK	ETX	SUM	CR	LF
1	2	2	1	2	1	1

Bytes

* Read target memory setting

V7 internal memory

Model	Type	Address	Reserved for system
2	2	4	10

PLC memory within 16 bits
Temperature cotrol/
PLC memory within 16 bits

Model	Type	Address	Expansion code	Reserved for system	Station Number (in [n:1] connection)	Reserved for system
2	2	4	2	2	2	4

PLC memory over 16 bits
Temperature cotrol/
PLC memory over 16 bits

Model	Type	Address	Expansion code	Reserved for system	Station Number (in [n:1] connection)
2	2	8	2	2	2

Memory card

Model	File No.	Record No.	Address	Reserved for system
2	2	4	4	4

Bytes

e.g. Reads the 2-word data, "ABCD" starting with the address $u0020(0014H) on the V7 of the station number 1.

Command

STX	V7 local No.	Read command	Number of words to read	Model	Type	Address	Reserved for system	ETX	SUM	CR	LF
	01H	20H	02H	00H	00H	0014H	0000000000H		8FH		
02H	30H 31H	32H 30H	30H 32H	30H 30H	30H 30H	30H 30H 31H 34H	30H 30H 30H 30H 30H 30H 30H 30H 30H 30H	03H	38H 46H	0DH	0AH

Response (Normal communication)

STX	V7 local No.	ACK	Data B	Data A	Data D	Data C	ETX	SUM	CR	LF
	01H	00H	42H	41H	44H	43H		60H		
02H	30H 31H	30H 30H	34H 32H	34H 31H	34H 34H	34H 33H	03H	36H 30H	0DH	0AH

Write (with sum check and CR/LF)

Write command

Command

STX	V7 local No.	Write command	Number of words to write	* Write target memory setting	Memory data 0	...	Memory data n	ETX	SUM	CR	LF
1	2	2	2	18	4		4	1	2	1	1

Bytes

Response

(Normal communication)

STX	V7 local No.	ACK	ETX	SUM	CR	LF
1	2	2	1	2	1	1

Bytes

(When an error occurs)

STX	V7 local No.	NAK	ETX	SUM	CR	LF
1	2	2	1	2	1	1

Bytes

* Write target memory setting

V7 internal memory

Model	Type	Address	Reserved for system
2	2	4	10

PLC memory within 16 bits
Temperature cotrol/
PLC memory within 16 bits

Model	Type	Address	Expansion code	Reserved for system	Station Number (in [n:1] connection)	Reserved for system
2	2	4	2	2	2	4

PLC memory over 16 bits
Temperature cotrol/
PLC memory over 16 bits

Model	Type	Address	Expansion code	Reserved for system	Station Number (in [n:1] connection)
2	2	8	2	2	2

Memory card

Model	File No.	Record No.	Address	Reserved for system
2	2	4	4	6

Bytes

e.g. Writes "AB12" to the addresses D0100 to 101(0064 to 0065H) on the PLC connected to the V7 of the station number 1.

Command

STX	V7 local No.	Write command	Number of words to write	Model	Type	Address	Reserved for system	Data B	Data A	Data 2	Data 1	ETX	SUM	CR	LF
	01H	21H	02H	01H	00H	0064H	0000000000H	42H	41H	32H	31H		2AH		
02H	30H 31H	32H 31H	30H 32H	30H 31H	30H 30H	30H 30H 36H 34H	30H 30H 30H 30H 30H 30H 30H 30H 30H 30H	34H 32H	34H 31H	33H 32H	33H 31H	03H	32H 41H	0DH	0AH

Response

(Normal communication)

STX	V7 local No.	ACK	ETX	SUM	CR	LF
	01H	00H		C6H		
02H	30H 31H	30H 30H	03H	43H 36H	0DH	0AH

Data Items for Protocols

- Transmission control code: 1 byte

Signal Name	Code (Hexadecimal)	Contents
STX	02H	Start of transmission block
ETX	03H	End of transmission block
CR	0DH	Carriage return
LF	0AH	Line feed

- V7 port number: 2 bytes
  Port numbers are used so that the host computer can identify each V7 series for access.
  The data range is from 01H to 1FH (1 to 31) and is converted into the ASCII code before use.
  The port number of the V7 series should be set on the V-SFT editor. (Refer to “V-SFT Setting.”)

- Command: 2 bytes
  Available commands are shown below.

Name	Code (Hexadecimal)	ASCII	Contents
Read	20H	32 30	Read from memory
Write	21H	32 31	Write to memory

- The number of words to be read or written: 2 bytes
  Set the number of words to be read or written by one command.
  The data range is from 01H to FFH (1 to 255) and is converted into the ASCII code before use.

- Memory address to be read or written: 18 bytes
  Specify the memory address to be accessed.
  Set the following code in the format as shown for “Read target memory setting” on page App7-5 and “Write target memory setting” on page App7-6.

  - Model

		Code (Hexadecimal)	ASCII
V7 series internal memory		00H	3030
PLC memory	0 to 65535	01H	3031
	65536 and above	81H	3831
Memory card		02H	3032
Temperature control/PLC2 memory	0 to 65535	03H	3033
	65536 and above	83H	3833

  - Type

	Type	Code (Hexadecimal)	ASCII
V7 internal memory	$u (user memory)	00H	3030
	$s (system memory)	01H	3031
	$L (non-volatile word memory)	02H	3032
	$LD (non-volatile double-word memory)	03H	3033
	$T (temporary user memory)	04H	3034
PLC memory	Depends on the PLC to be used. Set the type number indicated for “Available Memory” of respective PLCs on “Chapter 2” to “Chapter 33.”		
Temperature control/ PLC2 memory	Depends on the PLC to be connected to the temperature controller and PLC2 function. Set the type number indicated for “Available Memory” of respective temperature controllers on the Temperature Control Network Manual. Set the type number indicated for “Available Memory” of respective PLCs on “Chapter 2” to “Chapter 33” when using the PLC2Way function.		

  - Address
    Specify the memory address to be accessed.

- Expansion code
  Set the slot number of the CPU memory of the MITSUBISHI PLC or the CPU number of the Yokogawa PLC.
  Example:
  MITSUBISHI Slot No. 0: 00H
  MITSUBISHI Slot No. 1: 01H
  Yokogawa CPU No. 1: 00H
  Yokogawa CPU No. 2: 01H

  * If no expansion code or port number is required, enter “00” (= 3030 in the ASCII code).

- Port number
  1 : 1, Multi-link ..... Not used
  Multi-drop..... PLC port number
  Temperature controller..... Temperature controller port number

- File No.
  Specify the file number set in the [Memory Card Setting] dialog of the V-SFT editor.

- Record No.
  Specify the record number set in the [Memory Card Setting] dialog of the V-SFT editor.

- System reserved
  Enter “0” (= 30 in the ASCII code) for the number of bytes.
  The number of bytes for “system reserved” varies depending on the model.
  Example:

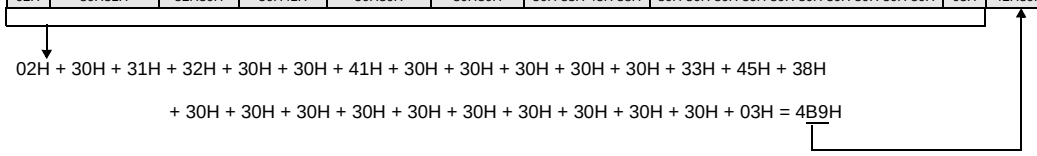
Model	Bytes	Code (Hexadecimal)	ASCII
V7 internal memory	10	0000000000H	30303030303030303030

Sum Check Code (SUM): 2 bytes

Data is added up (SUM), and the lower one byte (8 bits) of the sum is converted into the 2-digit ASCII code (hexadecimal).
A sum check code is shown below.

Example: Transmission mode: without CR/LF, with sum check
Command: 20 (data read)
Address: 10 words from $u1000 (03E8H)
When reading, a sum check will be performed as shown below.

STX	V7 port number	Command	Read words	Memory model	Memory type	Address	System reserved	ETX	SUM
	01H	20H	0AH	00H	00H	03E8H	0 0 0 0 0 0 0 0 0 0H		B9H
02H	30H31H	32H30H	30H41H	30H30H	30H30H	30H 33H 45H 38H	30H 30H 30H 30H 30H 30H 30H 30H 30H 30H	03H	42H39H



Response Code: 2 bytes

[ACK]
This code is received at normal termination.
00H (3030: ASCII)

[NAK]
This code is received at abnormal termination. (ASCII)
For more information, refer to page App7-9.

NAK: Error Codes

02H: Overrun/Framing error
An overrun or framing error is detected in the received data.
Send the command again.

03H: Parity error
A parity error is detected in the received data.
Send the command again.

04H: Sum check error
A sum error occurs with the received data.

06H: Count error
The memory read/write count is “0.”

0FH: ETX error
No ETX code is found.

11H: Character error
A character not used in the received data is found. (other than 0 to F)
Check the character and send the command again.

12H: Command error
An invalid command is given.

13H: Memory setting error
The address or device number is invalid.

1-byte Character Code List

Upper

Lower	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0	@	P	’	p								
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			’	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	¥	l	|								
D			-	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	■								

Appendix 8 Ladder Transfer Function

Up until now it has been necessary to debug the data by repeatedly disconnecting and reconnecting the two computer-PLC and V7-PLC cables when the V7 series is directly connected to a PLC equipped with only one CPU port. With the ladder transfer function, however, it is possible to write ladder programs or monitor the PLC memory using the V7 series without disconnecting and reconnecting the cables.

Applicable PLCs

The following PLC models support the ladder transfer function.

Manufacturer	Select PLC Type	CPU	Ladder Communication Program
Fuji Electric	SPB (N mode) and FLEX-PC CPU	Refer to page 8-1.	FlexCpu.lcm
Matsushita	MEWNET	Refer to page 15-1.	Mewnet.lcm
MITSUBISHI ELECTRIC	A series CPU*1	Refer to page 16-2.	LcMelACp.lcm
	QnH (Q) series CPU	Q02(H), 06H	MelQHCpQ.lcm
	Q00J/00/01 CPU	Q00J, 00, 01	
	QnH (Q) series link	Q00, Q01	MelQnA.lcm
	FX series CPU	FX1/2, FX0N	MelFx.lcm
	FX2N series CPU	FX2N/1N, FX2NC	
	FX1S series CPU	FX1S	
	FX-3UC series CPU	FX-3UC	
OMRON	SYSMAC C	Refer to page 19-1.	Sysmac.lcm
	SYSMAC CS1/CJ1		
Yokogawa Electric	FA-M3	Refer to page 33-1.	Yokogawa.lcm
	FA-M3R		

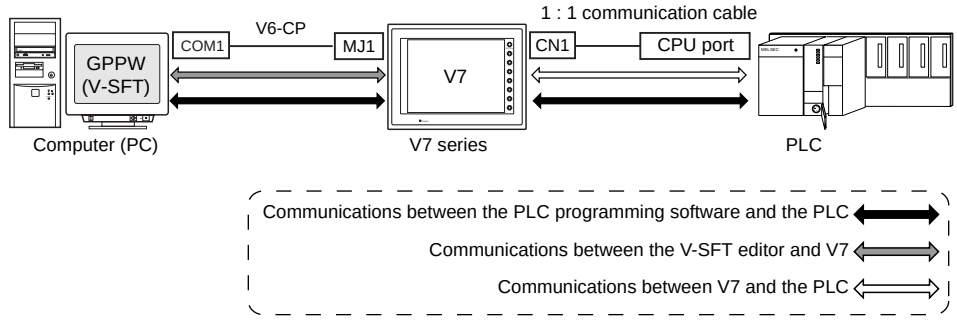
1 : n communication (multi-drop), multi-link communication, and multi-link 2 communication cannot be executed.

*1 V706 is available only with DU-01, the optional unit, because both MJ1 and MJ2 are nessesary for this connection.

Connection

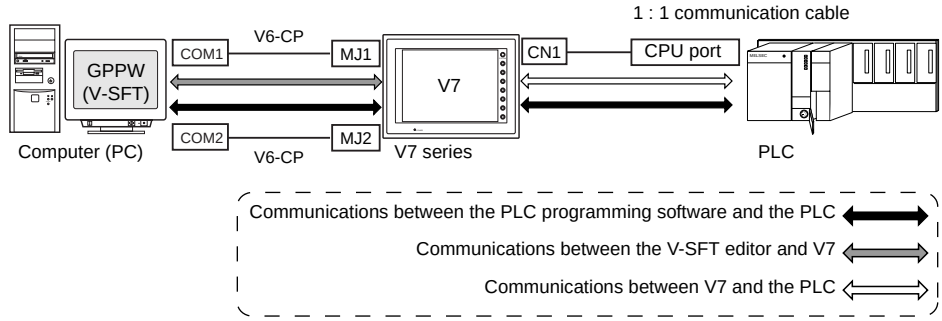
- Use Hakko Electronics' V6-CP cable when connecting the computer and the V7 series (MJ1/2). (Use Hakko Electronics's V6-CP-A cable when using MITSUBISHI ELECTRIC's A series CPU.)
- When connecting the V7 series (CN1) to the PLC, use a 1 : 1 communication cable as previously described.

When the computer is equipped with one COM port:



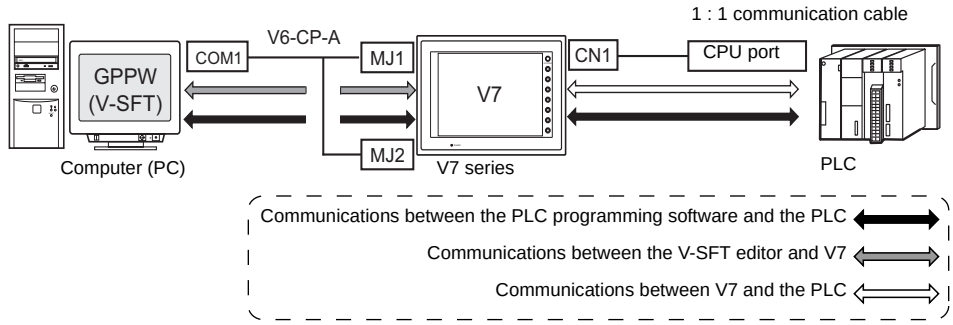
It is not possible to transfer both V-SFT screen data and PLC programming software at the same time. Stop either transfer.
Screen data transfer from the V-SFT editor is carried out via MJ1. The use of MJ1 is recommended if executing both the ladder transfer function and screen data transfer is necessary. In this case, screen data transfer via the V6-CP cable is possible through the Main Menu screen displayed on the V7. For more information, refer to page App8-4.

When the computer is equipped with two COM ports and two V6-CP cables are used:



Different COM ports and V6-CP cables are used respectively for transferring the V-SFT editor data and the PLC programming software. However, it is not possible to transfer both at the same time.

When MITSUBISHI ELECTRIC's A series CPU is used:

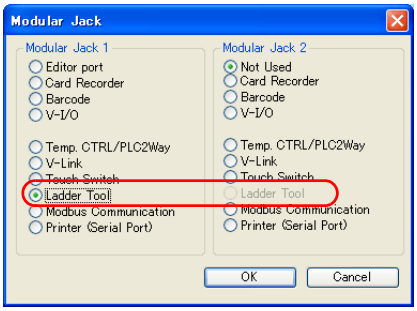


Setting

1. PLC type setting
   Click [System Setting] → [PLC Communication] → [PLC Model]. Select a type adapted to the ladder transfer function (page App8-1) in the [PLC Select] dialog.

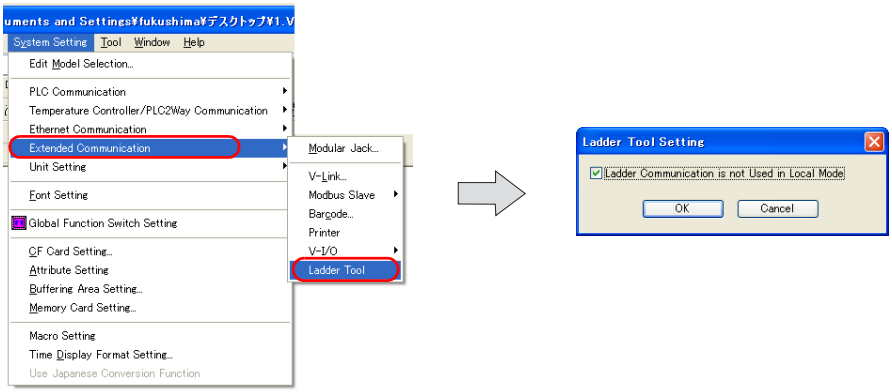
2. Modular jack setting
   Click [System Setting] → [Extended Communication] → [Modular Jack].
   Select [Ladder Tool] for [Modular Jack 1] or [Modular Jack 2] in the [Modular Jack] dialog.

   * Use both MJ1 and MJ2 when MITSUBISHI ELECTRIC's A series CPU is connected.



3. Environment setting
   Click [System Setting] → [Extended Communication] → [Ladder Tool].
   The [Ladder communication is not used in Local mode.] option is relevant to the operation that will take place while the Main Menu screen is displayed.

   - Unchecked: Transferring the V-SFT data or the PLC programming software is possible. Choose either transfer using the F2 switch.
   - Checked: Transferring only the V-SFT data is possible. Transferring the PLC programming software is disabled.



Different V7 operations depending on item settings (“2” and “3” in the previous section)

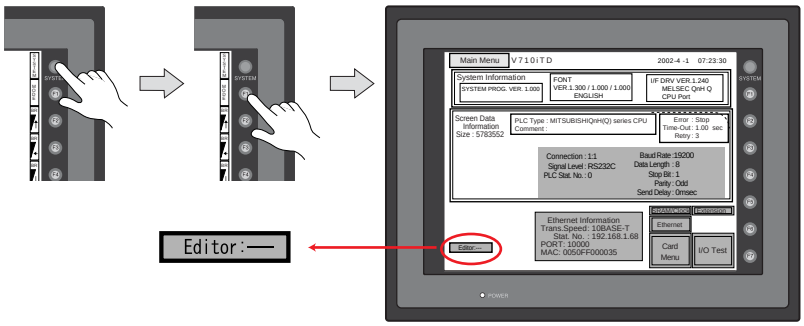
Depending on which items are selected in the [Modular Jack] dialog and the [Ladder Tool Setting] dialog, operations possible on the V7 (communication with the computer enabled/disabled) are determined.

V-SFT Setting			V7 Status			
Modular Jack		Ladder Tool Setting	RUN		Main Menu Screen	
MJ1	MJ2	Check	Ladder transfer	Transferring screen data MJ1 *1	Ladder transfer	Transferring screen data MJ1 *1
Editor port	Ladder tool	Unchecked	○	○	○	○
		Checked	○	○	×	○
Other than editor port and ladder tool		Unchecked	○	×	○	○
		Checked	○	×	×	○
Ladder tool	Other than ladder tool	Unchecked	○	×	△*2	△*2
		Checked	○	×	×	○

*1 Screen data transfer via LAN/USB is possible, irrespective of setting differences.

*2 Switching on the Main Menu screen

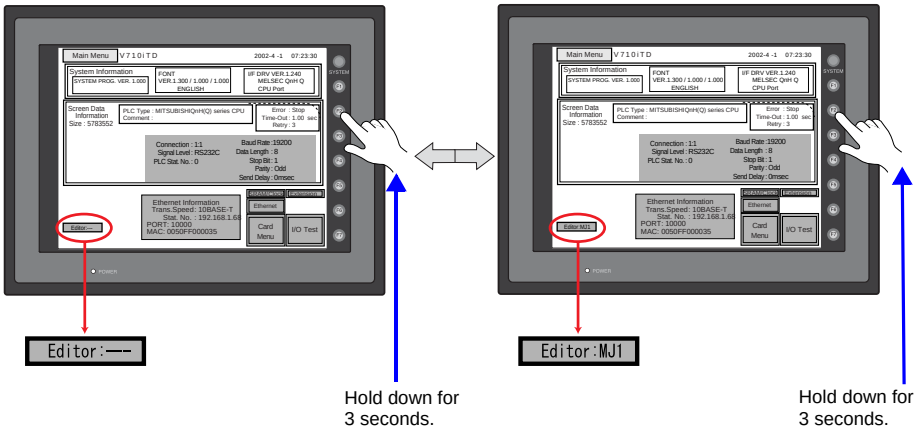
Press the SYSTEM and F1 switches. The Main Menu screen is displayed.



“Editor:---” appears, indicating the ladder transfer mode, in the lower left corner of the screen. At this time, screen data transfer via MJ1 is not possible as shown below.

Display	Ladder Transfer	Transferring Screen Data
		MJ1
Editor: ---	○	×
Editor: MJ1	×	○

Use the F2 switch to switch between “Editor:---” and “Editor:MJ1” displayed on the screen. Hold down the switch for 3 seconds or more.



* Since V609E is not equipped with function switches, switching between “Editor:---” and “Editor:MJ1” on the Main Menu screen is not possible. Therefore, check [Ladder communication is not used in Local mode.].
At this time, check the system program version and update it if the version is old before transferring the screen data. (adapted to V-SFT editor version 2.0.9.0 or later, V7 system program version 1.080 or later, and V6 system program version 1.570 or later)

Notes on Ladder Transfer Function

- On-line editing between the V-SFT editor and the V7 series is not possible. If attempted, communications between the PLC programming software and the PLC will not be performed correctly.
- Communicating statuses with the PLC programming software and the PLC during communications between the V-SFT editor and the V7 series

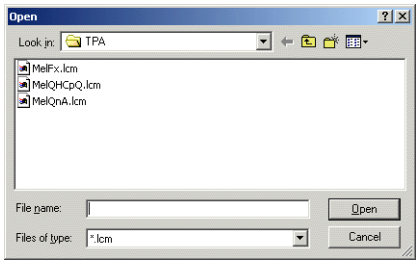
V-SFT	PLC Programming Software
Writing to V7	Communications disconnected (normal communications on completion of writing)
Reading from V7	Normal communications
Comparing with V7	Normal communications

- Baud rate setting
The [Baud Rate] setting in the [Comm. Parameter] dialog applies to the baud rate between the V series and the PLC. However, if communication with the PLC programming software (monitoring, etc.) starts by means of the ladder transfer function, the baud rate set on the software takes effect. The baud rate stays enabled until the V7 series is turned off and on again.
Keeping this in mind, set the PLC programming software baud rate and the [Baud Rate] in the [Comm. Parameter] dialog to the same value.
- With [Ladder Tool] checked in the [Modular Jack] dialog, it is prohibited to register the devices to be monitored for V7-PLC communication even though the PLC programming software is not started. The screen display speed will decrease somewhat accordingly.
- Also, when the ladder program is transferred in the RUN mode of the V7 series, communications are synchronized; therefore, the performance of both the V7 series and the PLC programming software decreases.

Ladder Communication Program

If using the ladder communication function, the V series requires the ladder communication program. Normally when screen data is transferred, the program is also transferred. To transfer the ladder communication program only, follow the procedure described below.

1. Select [Ladder com. prg.] in the [Transfer] dialog, and click [PC->].
2. The dialog box below is displayed. Select the ladder communication program that corresponds to the PLC model (refer to page App8-1) and click the [Open] button. Program transfer to the V7 series starts.



Connection Compatibility List

V715/V712/V710/V708/V706+DU-01

- 1 : 1.....One set of the V7 series is connected to one PLC (1:1 connection).
- 1 : n.....One V7 series is connected to multiple PLCs.
- Multi-link2 .....One PLC is connected to a maximum of four V7 series.
- n : 1 (Multi-link).....One PLC is connected to multiple V7 series.
- To use Ethernet communications with the V7 or V706 (except for V715 and V7i), a communication interface unit or a option unit is necessary.
- To use field network or controller network, a communication interface unit is necessary.

October, 2006

Manufacturer	PLC	1 : 1	1 : n (Multi-drop)	Multi-link 2	n : 1 (Multi-link)	Ethernet	Field Network	Controller Network
Allen-Bradley	PLC-5	○	○	○		○		
	SLC500	○	○	○		○		
	Micro Logix 1000	○	○	○				
	Control Logix/Compact Logix	○		○		○		
Automationdirect	Direct LOGIC	○		○				
	Direct LOGIC (K-Sequence)	○		○				
Baldor	Mint	○		○				
DELTA	DVP series	○	○	○				
FANUC	Power Mate	○		○				
FATEK AUTOMATION	FACON FB series	○	○	○				
Fuji Electric	MICREX-F series	○	○	○	○		T-LINK	
	SPB (N mode) & FLEX-PC series	○	○	○			OPCN-1	
	SPB (N mode) & FLEX-PC CPU	○		○				
	FLEX-PC COM (T)	○	○	○	○			
	FLEX-PC (T)	○		○				
	FLEX-PC CPU (T)	○		○				
GE Fanuc	90 series	○	○	○				
	90 series (SNP-X)	○		○				
Hitachi	HIDIC-H	○	○	○	○			
	HIDIC-EHV	○	○	○	○	○		
	HIDIC-S10/2α, S10mini	○		○		○	OPCN-1	
	HIDIC-S10/4α	○		○				
	HIDIC-S10/ABS	○		○				
	HIDIC-S10V	○		○		○		
IDEC	MICRO3	○	○	○				
	MICRO Smart	○	○	○				
KEYENCE	KZ series link	○	○	○				
	KZ-A500 CPU	○		○				
	KZ/KV series CPU	○	○	○				
	KZ24/300CPU	○		○				
	KV10/24CPU	○		○				
	KV-700	○		○		○		
	KV-1000	○		○		○		
KOYO ELECTRONICS	SU/SG	○	○	○				
	SR-T	○	○	○				
	SR-T (K Protocol)	○		○				
	SU/SG (K-Sequence)	○		○				
	SU/SG (MODBUS RTU)	○	○	○				

Manufacturer	PLC	1 : 1	1 : n (Multi-drop)	Multi-link 2	n : 1 (Multi-link)	Ethernet	Field Network	Controller Network
LS	MASTER-K10/60/200	○		○		○		
	MASTER-K500/1000	○	○	○	○			
	MASTER-KxxxS	○		○				
	MASTER-KxxxS CNET	○	○	○				
	GLOFA CNET	○	○	○				
	GLOFA GM series CPU	○		○		○		
	GMR series					○		
	XGT/XGK series	○	○	○		○		
Matsushita Electric Works	MEWNET	○	○	○	○	○		
MITSUBISHI ELECTRIC	A series link	○	○	○	○		CC-Link OPCN-1	Net10
	A series CPU	○		○				
	QnA series link	○	○	○		○	CC-Link	Net10
	QnA series CPU	○		○	○ with V-MDD			
	QnH (Q) series link	○	○	○		○	CC-Link	Net10
	QnH (A) series CPU	○		○				
	QnH (Q) series CPU	○		○				
	QnH (Q) series link (Multi CPU)	○	○	○		○		
	QnH (Q) series CPU (Multi CPU)	○		○		○		
	Q00J/00/01CPU	○		○		○	CC-Link	Net10
	FX series CPU	○		○				
	FX2N series CPU	○		○				
	FX1S series CPU	○		○				
	FX series link (A Protocol)	○	○	○	○			
	FX-3UC series CPU	○		○				
	A link + Net10	○	○ *1		○			
MODICON	Modbus RTU	○	○	○				
MOELLER	PS4	○		○				
OMRON	SYSMAC C	○	○	○	○		OPCN-1	
	SYSMAC CV	○	○	○				
	SYSMAC CS1/CJ1	○		○		○		
	SYSMAC CS1/CJ1 DNA	○	○ *1			○		
SAIA	PCD	○	○	○				
SAMSUNG	SPC series	○	○	○	○			
	N_plus	○	○	○	○			
	SECNET	○	○	○	○			
SHARP	JW series	○	○	○	○			FL-Net
	JW100/70H COM port	○	○	○	○			
	JW20 COM port	○	○	○	○			
	JW300 series	○	○	○		○		
SHINKO ELECTRIC	SELMART	○	○	○	○			
Siemens	S5	○		○				
	S5 PG port	○		○				
	S7	○		○			PROFIBUS -DP	
	S7-200 PPI	○	○		○			
	S7-300/400MPI	○	○ *2		○ *3			
	S7-300MPI (V-MPI)	○	○ *2		○ *3			
	S7-300MPI (HMI ADP)	○		○				
	S7-300MPI (PC ADP)	○		○				
	S7-300MPI (Helmholz SSW7 ADP)	○		○				
	TI500/505	○		○				
TAIAN	TP02	○	○	○				
Telemecanique	TSX Micro				○			
TOSHIBA	T series	○	○	○	○	○		
	EX series	○	○	○				

Manufacturer	PLC	1 : 1	1 : n (Multi-drop)	Multi-link 2	n : 1 (Multi-link)	Ethernet	Field Network	Controller Network
TOSHIBA MACHINE	TC200	○	○	○				
Toyoda Machine Works	TOYOPUC	○	○	○	○	○		
VIGOR	M series	○	○	○				
Yamatake	MX series	○		○				
Yaskawa Electric	Memobus	○	○	○				
	CP9200SH/MP900	○	○	○				
Yokogawa Electric	FA500	○	○	○	○			
	FA-M3	○	○	○	○	○		
	FA-M3R	○	○	○	○	○		FL-Net

*1 When the V7 series is connected to the PLC on a controller network, it is possible to perform communications with other PLCs on the same network.
*2 A maximum of three PLCs compatible with MPI can be connected.
*3 A maximum of three V7 series compatible with MPI can be connected.

V706

- 1 : 1.....One set of the V706 series (MJ2) is connected to one PLC (1:1 connection).
- 1 : n.....One V7 series is connected to multiple PLCs.
- Multi-link2 .....One PLC is connected to a maximum of four V7 series.
- n : 1 (Multi-link).....One PLC is connected to multiple V7 series.
- To perform communications with the PLC at the MJ port using PLC2Way function, use the RS-232C or RS-485 (2-wire system) for connection.

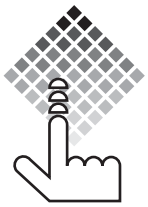
October, 2006

Manufacturer	PLC	1 : 1	1 : n (Multi-drop)	Multi-link 2	n : 1 (Multi-link)	Ethernet	Field Network	Controller Network
Allen-Bradley	PLC-5	○	○	○				
	SLC500	○	○	○				
	Micro Logix 1000	○	○	○				
	Control Logix/Compact Logix	○		○				
Automationdirect	Direct LOGIC	○		○				
	Direct LOGIC (K-Sequence)	○		○				
Baldor	Mint	○		○				
DELTA	DVP series	○	○	○				
FANUC	Power Mate	○		○				
FATEK AUTOMATION	FACON FB series	○	○	○				
Fuji Electric	MICREX-F series	○	○	○	○			
	SPB (N mode) & FLEX-PC series	○	○	○				
	SPB (N mode) & FLEX-PC CPU	○		○				
	FLEX-PC COM (T)	○	○	○	○			
	FLEX-PC (T)	○		○				
	FLEX-PC CPU (T)	○		○				
GE Fanuc	90 series	○	○	○				
	90 series (SNP-X)	○		○				
Hitachi	HIDIC-H *5	○	○	○	○			
	HIDIC-EHV	○	○	○	○			
	HIDIC-S10/2α, S10mini	○		○				
	HIDIC-S10/4α	○		○				
	HIDIC-S10/ABS	○		○				
	HIDIC-S10V	○		○				
IDEC	MICRO3	○	○	○				
	MICRO Smart	○	○	○				
KEYENCE	KZ series link	○	○	○				
	KZ-A500 CPU	○		○				
	KZ/KV series CPU	○	○	○				
	KZ24/300CPU	○		○				
	KV10/24CPU	○		○				
	KV-700	○		○				
	KV-1000	○		○				

Manufacturer	PLC	1 : 1	1 : n (Multi-drop)	Multi-link 2	n : 1 (Multi-link)	Ethernet	Field Network	Controller Network
KOYO ELECTRONICS	SU/SG	○	○	○				
	SR-T	○	○	○				
	SR-T (K Protocol)	○		○				
	SU/SG (K-Sequence)	○		○				
	SU/SG (MODBUS RTU)	○	○	○				
LS	MASTER-K10/60/200	○		○				
	MASTER-K500/1000	○	○	○	○			
	MASTER-KxxxS	○		○				
	MASTER-KxxxS CNET	○	○	○				
	GLOFA CNET	○	○	○				
	GLOFA GM series CPU	○		○				
	GMR series							
	XGT/XGK series	○	○	○				
Matsushita Electric Works	MEWNET	○	○	○	○			
MITSUBISHI ELECTRIC	A series link	○	○	○	○			
	A series CPU	○						
	QnA series link	○	○	○				
	QnA series CPU	○		○	○ with V-MDD			
	QnH (Q) series link	○	○	○				
	QnH (A) series CPU	○		○				
	QnH (Q) series CPU	○		○				
	QnH (Q) series link (Multi CPU)	○		○				
	QnH (Q) series CPU (Multi CPU)	○		○				
	Q00J/00/01CPU	○		○				
	FX series CPU *4	○		○				
	FX2N series CPU	○		○				
	FX1S series CPU	○		○				
	FX series link (A Protocol)	○	○	○	○			
	FX-3UC series CPU	○		○				
	A link + Net10	○	○ *1		○			
MODICON	Modbus RTU	○	○	○				
MOELLER	PS4	○		○				
OMRON	SYSMAC C	○	○	○	○			
	SYSMAC CV	○	○	○				
	SYSMAC CS1/CJ1	○		○				
	SYSMAC CS1/CJ1 DNA	○	○ *1					
SAIA	PCD	○	○	○				
SAMSUNG	SPC series	○	○	○	○			
	N_plus	○	○	○	○			
	SECNET	○	○	○	○			
SHARP	JW series	○	○	○	○			
	JW100/70H COM port	○	○	○	○			
	JW20 COM port	○	○	○	○			
	JW300 series	○	○	○				
SHINKO ELECTRIC	SELMART	○	○	○	○			
Siemens	S5	○		○				
	S5 PG port	○		○				
	S7	○		○				
	S7-200 PPI	○	○		○			
	S7-300/400MPI	○	○ *2		○ *3			
	S7-300MPI (V-MPI)							
	S7-300MPI (HMI ADP)							
	S7-300MPI (PC ADP)							
	S7-300MPI (Helmholz SSW7 ADP)							
	TI500/505	○		○				

Manufacturer	PLC	1 : 1	1 : n (Multi-drop)	Multi-link 2	n : 1 (Multi-link)	Ethernet	Field Network	Controller Network
TAIAN	TP02	○	○	○				
Telemecanique	TSX Micro				○			
TOSHIBA	T series	○	○	○	○			
	EX series	○	○	○				
TOSHIBA MACHINE	TC200	○	○	○				
Toyoda Machine Works	TOYOPUC	○	○	○	○			
VIGOR	M series	○	○	○				
Yamatake	MX series	○		○				
Yaskawa Electric	Memobus	○	○	○				
	CP9200SH/MP900	○	○	○				
Yokogawa Electric	FA500	○	○	○	○			
	FA-M3	○	○	○	○			
	FA-M3R	○	○	○	○			

*1 When the V7 series is connected to the PLC on a controller network, it is possible to perform communications with other PLCs on the same network.
*2 A maximum of three PLCs compatible with MPI can be connected.
*3 A maximum of three V7 series compatible with MPI can be connected.
*4 Connection available only with FX0N
*5 RS-422 connection only for COMM-2H



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